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Engineering Library

THE NATIONAL TELEPHONE MAGAZINE

JUNE 15, 1941

JUN 20 1941

TELEPHONE ENGINEER

Features: June Rate Hearing Dismissed by FCC . . . News Highlights . . . Wire Chief's Training Course . . . Reports on Illinois and Wisconsin Conventions . . . Communications and Electronic Developments . . . Long Lines

MANAGEMENT ENGINEERING
MAINTENANCE

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TELEPHONE ENGINEER

MANAGEMENT · ENGINEERING · MAINTENANCE

Vol. 45, No. 6 JUNE, 1941

ACROSS THE Editor's Desk

When Mr. Charles F. Mason, president of the California Association and of Associated Telephone Co., Ltd., tendered us a personal invitation to attend the California convention this month we had expected to accept. But the pleasure of meeting personally many of our California, Oregon and Washington subscribers must be denied us. Our dream of vacation has faded—but we have hopes of attending these meetings next year. May we consider the invite a rain-check?

▼

Win Rodormer, of Reliable Electric, had a poem pass over his desk the other day and he passed it on to us. We think it appropriate to the times and pass it on with no comment:

"Keep your temper, gentle sir,
Writes the manufacturer,
Though your goods are overdue,
For a month or maybe two,
We can't help it, please don't swear,
Labor's scarce and metal's rare.
Can't get steel, can't get dies,
These are facts, we tell no lies,
Harry's drafted, so is Bill,
All our work is now uphill,
So your order, we're afraid,
May be still a bit delayed.
But you'll get it, don't be vexed,
Maybe this month, maybe next!
Keep on hoping, don't say die,
We'll fill your order by and by."

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RAY W. SMITH, Editor—B. C. BURDEN, Technical Editor
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Founded in 1909

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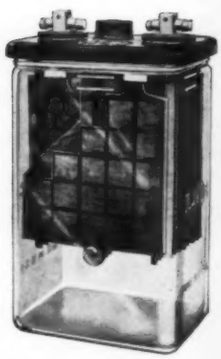
Upholding a telephone tradition

Quick thinking....

won this race against death



ANSWERING her switchboard signal, the operator heard a faint voice call for help. In an instant, she had dispatched police to the home of the subscriber . . . only to have their report come back that the house was entirely vacant.

But meanwhile the operator had taken the initiative to discover the exact location of the telephone in the house. She sent the police back once more, armed with this detailed information. They found a man overcome by fumes, and were able to save his life by a slim margin of minutes.

Quick thinking, initiative and resourcefulness in the face of emergencies are part of the telephone tradition which has dependability as its aim. This is the fabric of the service, and its strong strands are made up both of people and equipment. There is no stronger testimony to the dependability of Exide Batteries than the part they have played for forty-six years in helping to build the telephone tradition.

No matter what the service—common battery, emergency reserve, signal, or P.B.X., in small or large exchanges—you will find in Exides dependability to match the highest telephone standards.

Exide
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THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

The "Good-bye" that said "Hello" to the World

Twenty-six years ago, a young Bell System engineer sat waiting at the Eiffel Tower, in Paris, hoping to hear the first spoken words transmitted across the Atlantic.

Hour after hour he listened. He knew that a fellow engineer at Arlington, Virginia, was trying to reach him. Once, he heard counting: *one, two, three . . . one, two, three.* It was very faint, but it gave him hope.

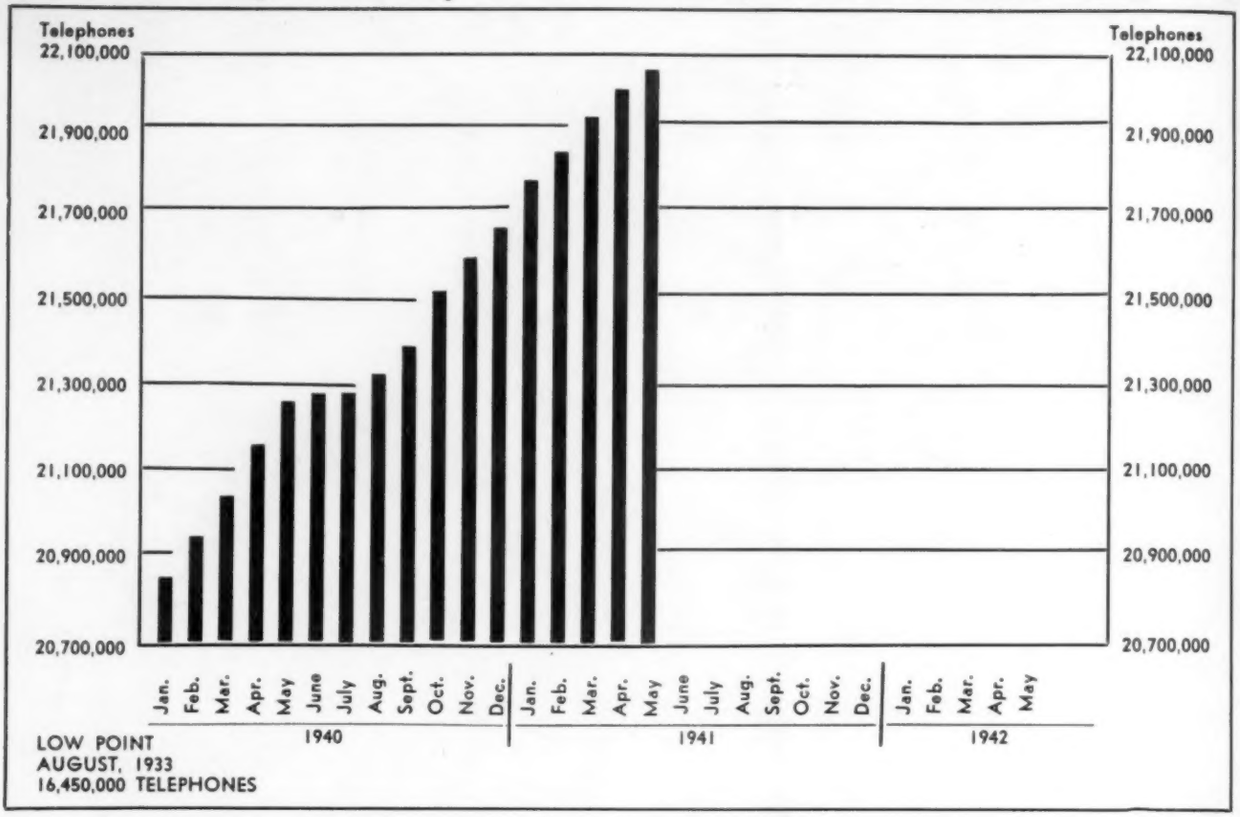
For days, he stood watch, straining to catch a phrase, a word, a syllable. On October 21, 1915, he heard clearly and unmistakably: *"Good-bye, Shreeve."* The human voice had leaped the Atlantic!

At the same time, the message was picked up by another Bell System sentinel in Honolulu — on the other side of the world!

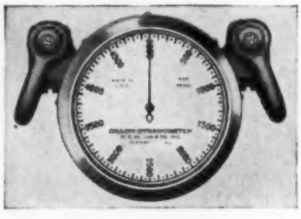
That is the story of the first successful use of the radio telephone in overseas communication. Today, thanks to Bell System development, America's telephones can be connected, except in time of war, to almost any other telephone in the world.

BELL TELEPHONE SYSTEM

Monthly Telephone Station Barometer



LOW POINT
AUGUST, 1933
16,450,000 TELEPHONES



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0 to 3,500 Lbs.	80.50
0 to 5,000 Lbs.	85.50
0 to 7,500 Lbs.	91.00
0 to 10,000 Lbs.	97.50
0 to 12,500 Lbs.	107.50
0 to 15,000 Lbs.	117.50

DIAL DIAMETER: 5"
WEIGHT 4½ pounds

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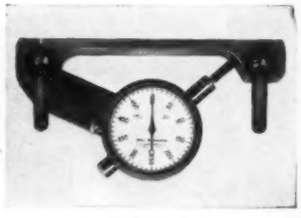

MODEL B

DIMENSIONS: 6" x 3¼" x 1"

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0 to 750 Lbs.	57.50
0 to 1,000 Lbs.	65.00

Both models include attachment shackles and carrying case.

DIAL DIAMETER: 2¼"
WEIGHT: 1½ pounds

WILL LAST A LIFETIME FOR A LIFE TIME OF *PERFECT* PERFORMANCE

When it comes to **accurately** measuring the tension applied to guy, cable or long span wire, DILLON Dynamometers have no equal. Of flawless design both inside and out, these rugged utility instruments fill a long existing need for a **light weight** tension indicator **at a reasonable price.** With DILLON Dynamometers as part of crew equipment, repair expenses occasioned by over-taut wires become a thing of the past. In use by leading Telephone Companies everywhere—they represent a vital link in the construction of flawless lines Today for American defense **Tomorrow!** Equip **your** crews with DILLON Dynamometers by ordering through your jobber or direct.

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EDITORIAL—

F. C. C. Protects Independent Companies

FROM the standpoint of Independent telephone companies, the most important part of the agreement reached June 4th between the Federal Communications Commission and the Bell Telephone System for reductions effective July 10 in Bell long distance rates, is stated in a paragraph in the press release given out by F. C. C. Since few if any newspapers published the press release in full, this very significant paragraph has probably escaped the attention of many Independent companies.

This paragraph says (the italics are our own):

"The Commission announced that it expected the American Company to assume all reductions in revenue brought about by these reductions in interstate schedules in which Long Lines is a participating carrier, and that arrangements should be made with Associated companies *and Independent connecting companies so that these reductions would not affect revenues of either of the latter two groups.*"

The manner in which this applies to Independent telephone companies is, we think, quite clear: In making this agreed-upon reduction of its interstate toll rates, the Bell System is expected to see that none of it comes out of its Independent connecting companies.

The Commission took this action upon its own initiative. The action is entirely consistent with the purpose of the Bell toll rate hearing—which was to begin June 9th and was called off because of the agreed-upon reduction of rates—which hearing was for the purpose of determining whether the rates of the Long Lines Department of American Telephone and Telegraph Company should be reduced.

Independent companies should be highly appreciative of this action of the Federal Communications Commission. It is now up to the Independent companies to do their part in implementing this provision of the agreed-upon Bell toll rate reduction; that is, to do what it is necessary for them to do in order to see that they do not themselves absorb any part of the reduction. No doubt the associations, state and national — and particularly the United States Independent Telephone Association, which has been interesting itself in such matters as this—will take the lead in the implementing process. It is of course to be assumed that the Bell System companies will cooperate fully.

The action of F. C. C. may prove to be a mile-post on the question that has been so long pending as to what is the proper compensation to an Independent connecting company for handling Bell tolls. It may be a mile-post because—and Independent companies can we think be heartened by this—this action indicates that the Federal Communications Commission looks at this question in a manner similar to the position Independents have been taking on it.

THE position of the Independent companies is, as we understand it, that they are entitled to complete reimbursement for their costs of handling Bell toll business, plus reasonable compensation—the costs to include depreciation and fair return on their property to the extent it is used for such Bell toll business, and to be calculated on the "station-to-station" basis.

They say they have no voice in the making or changing of Bell toll rates, and they must necessarily charge the rates fixed by the Bell Companies. They say that they are not a lot of little "junior" partners in a partnership with a big "senior" partner who is to do all the deciding, both as to rates and as to the compensation paid them.

The Bell position comes, as we understand it, to the point that if there is a loss or reduction of revenue, the Independents must bear a part of it.

The Bell System, also, as we understand it, takes the position that if costs enter into the situation, they should be calculated on the "board-to-board" basis.

The June 4th settlement, and particularly that paragraph of it we have quoted herein, maintains at least for the time being an important part of the position taken by the Independent companies. This seems a particularly good time for them to assert their beliefs, through their associations or otherwise, on the whole of their position.

Developed and constantly improved *in the world's largest dry battery laboratory, "Eveready" "Columbia" "Gray Label" Long Life telephone cells provide maximum efficiency at rock-bottom economy. It pays to specify them. Available at leading telephone supply distributors.*

...but ONE is a CHAMPION!

Performance makes the difference!

Consistent *skill* is the mark of the champion fly caster...skill developed through years of painstaking practice.

"Eveready" "Columbia" "Gray Label" Long Life telephone cells are *skillfully* fabricated . . . made to one standard of high quality by specialists in battery manufacture. Laboratory tests and field experience have proven, again and again, that they possess higher sustained voltage characteristics . . . longer life . . . resulting in "peak" transmission efficiency, and lower operating costs.

That's why more independent telephone companies use "Eveready" "Columbia" "Gray Label" Long Life telephone cells than any other brand.

CHAMPION FOR THREE REASONS

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June Rate Hearing Is Dismissed by FCC

By RAY W. SMITH

THE lengthy hearings on the FCC's investigation into interstate telephone rates which was slated to commence during the second week in June were dismissed five days before the proceeding when the Commission concluded a negotiated agreement with the American Telephone and Telegraph Company for the institution of an annual reduction in long distance charges of nearly $14,000,000 to become effective July 10.

The negotiations which culminated in this rate reduction received high praise from FCC Chairman James Lawrence Fly who commented that it was brought about by "mutual agreement" of the Commission and the A. T. & T. and "is another example of the constructive results which can be acomplished when government and industry sit around the conference table in an atmosphere of mutual respect and good faith." The negotiations for the rate reduction had been carried on for approximately a week between leading executives of the A. T. & T., including President Walter S. Gifford, and FCC Commissioners Paul A. Walker and Ray C. Wakefield.

The Commission stated that the reduction amounted to about a 14 per cent cut in rates for users of the long distance telephone and other A. T. & T. Long Lines service. It comprised a $12,500,000 annual reduction to be applied to the rates of the A. T. & T. Long Lines Department and the other $1,475,000 to form a reduction of the interstate rates of the 21 Associated Bell System Companies.

Of especial and significant importance to the Independent telephone industry as well as to the Associated Bell System Companies was the announcement of the FCC that "it (the Commission) expected the American Telephone and Telegraph Co. to assume all reductions in revenue brought about by these reductions in interstate schedules in which the Long Lines is a participating carrier and that arrangement should be made with Associated Companies and Independent connecting companies so that these reductions would not affect revenues of either of the latter groups." This marked the first time, it was understood, a reduction in interstate telephone rates has carried the explicit provision that there should be no cut in the toll compensation and divisions between the A. T. & T. and the Bell Companies and Independents under the existing arrangements.

Another significant fact in the negotiated reduction was that less than half of the $14,000,000 slash came from the message toll rate structure. The actual reduction in message rates only aggregated $6,170,000 of which the Long Lines lowered their message charges by $5,720,000 and the Bell System Companies by $450,000. The bulk of the reduction —a total of $7,200,000 — was made through the elimination of a higher overtime charge for person-to-person calls and of the report charges which are applicable to uncompleted person-to-person and reversed charge calls. The higher rate for the overtime beyond the initial three-minute conversation period in the case of person-to-person calls has been a subject of criticism and study by the FCC ever since it started its interstate telephone regulatory functioning so that this move has been anticipated as bound to occur for some time. The overtime for person-to-person calls under the new rates effective July 10 will be the same as for the station-to-station calls, but of course the person-to-person rates for the initial three-minute period will remain at a higher level than for station-to-station conversations.

While it definitely terminated the investigation and hearings, slated to start June 9, the Commission stated that it will continue "studies pertinent to the rate base and the cost of furnishing telephone service, and related subjects, including methods of separation, depreciation practices, rate of return, original cost and Western Electric prices." The inquiry into the methods of separation may be one of the first things tackled by the FCC because in their reply to the April 1 Commission order for the interstate rate investigation the A. T. & T. and Bell System petitioned the Federal agency to institute such a proceeding so as to evolve an acceptable formula for all regulatory bodies. The A. T. & T. petition proposed a joint proceeding on the separation methods to be conducted by the FCC with the state commissions, the Bell System and Independent telephone companies participating. This, it was contended, should be successful in the formulation of standard separation methods and rules which would be acceptable to the Federal and state regulatory fields.

The reduction of $6,170,000 in message interstate toll rates is on most interstate calls during the day where the airline distances involved are over 144 and less than 1,530 miles, the Commission stated, but some of the reduced rates in this same mileage range will apply to evening and night and Sunday calls. In addition to the reduction of message rates and the revision of person-to-person overtime and elimination of report charges, the A. T. & T. negotiated agreement provided for a message rate reduction on toll calls between the United States and Canada amounting to $280,000 a year. This is considered an important step also in the closer communications linking of the United States and Canada. Another reduction was $250,000 by the Long Lines and $25,000 by the Associated Companies on broadcasting program wire

rates.

The paring down of the overtime charges for person-to-person calls to the same level as for the station-to-station service eliminated a bone of contention between the FCC and the A. T. &. T. which has been the subject of many discussions. It will be recalled that this situation was criticized by Carl I. Wheat, who is now an attorney representing important Independent telephone groups, when he was head of the FCC Telephone Rate and Research Department during the 1935-38 Telephone Investigation.

The $14,000,000 negotiated 'reduction was the third major cut in interstate telephone rates by the A. T. & T. brought about under the negotiation regulatory process with the FCC since 1937. The Commission noted that the total of negotiated savings to the public during and since the FCC's special Telephone Investigation to more than $45,000,000 annually.

In announcing the rate reduction, the FCC gave the following table showing the different items of reduced revenues:

Type of Service	Long Lines	Other Interstate
Message	$ 5,720,000	$ 450,000
Person-to-Person (Overtime)	5,500,000	800,000
Report Charges	750,000	200,000
United States-Canada (Rates between)	280,000	
Program Service (Broadcasting)	250,000	25,000
Totals	$12,500,000	$1,475,000

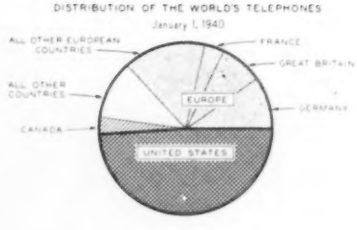
Some typical examples of reductions in station-to-station and person-to-person calls were cited by the FCC as follows:

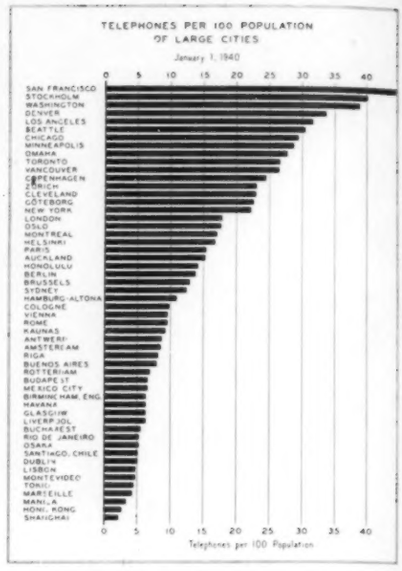
		Station-to-Station			
		Day		Night and Sunday	
Route	Rate Mileage	Present	Illus-trative	Present	Illus-trative
Chicago-Indianapolis	171	$ .75	$ .70	$ .45	$ .45
Washington-New York	204	.85	.80	.55	.50
New York-Pittsburgh	327	1.15	1.05	.70	.70
Washington-Cincinnati	426	1.35	1.20	.85	.80
New York-Detroit	492	1.50	1.35	.95	.95
Washington-Chicago	605	1.65	1.50	1.10	1.10
Boston-Chicago	859	2.10	2.00	1.40	1.40
Washington-Tulsa	1063	2.50	2.30	1.65	1.60
New York-Oklahoma City	1352	2.90	2.80	1.95	1.95
Washington-Denver	1506	3.25	3.00	2.25	2.10

		Person-to-Person			
		Day		Night and Sunday	
Route	Rate Mileage	Present	Illus-trative	Present	Illus-trative
Chicago-Indianapolis	171	$1.05	$ .95	$ .75	$ .70
Washington-New York	204	1.20	1.10	.90	.80
New York-Pittsburgh	327	1.55	1.40	1.10	1.05
Washington-Cincinnati	426	1.80	1.60	1.30	1.20
New York-Detroit	492	2.00	1.80	1.45	1.40
Washington-Chicago	605	2.20	2.00	1.65	1.60
Boston-Chicago	859	2.80	2.65	2.10	2.05
Washington-Tulsa	1063	3.35	3.05	2.50	2.35
New York-Oklahoma City	1352	3.85	3.75	2.90	2.90
Washington-Denver	1506	4.25	4.00	3.25	3.10

The World's Telephones

THE United States has a total of 20,830,950 telephones as of January 1, 1940, which is 48.85 per cent of the total world supply, and a ratio of 15.85 telephones to every 100 persons, it is revealed by the annual figures released June 3 by the Chief Statistician of the American Telephone and Telegraph Co. The entire world





has 42,642,252 telephones, or 1.97 per 100 population. Sixty per cent of the world's telephones are operated under private ownership, while the remaining forty per cent is under government ownership.

Although New York City has the largest number of telephone stations of any city in the world, 1,669,904, it ranked sixteenth in density of service, having 22.44 instruments for every 100 persons. San Francisco led the world on that score, with 44.85 phones per 100 population, although it contained only 290,990 phones. Stockholm is second, with 40.16 phones per 100 people, followed by Washington (38.84), Denver (33.67), Los Angeles (31.62), Seattle (30.48), Chicago (29.42), Minneapolis (28.72), Omaha (27.76) and Cleveland (22.93).

Due to the United States leadership, North America at the start of 1940 topped the rest of the world with 22,558,727 telephones, 52.9 per cent of the Globe's total. Second was Europe with 15,765,994 phones, 36.97 per cent of the world amount. It is debatable what the effect of Nazi control would be on the number of phones in Europe; the German conquerors would probably limit the stations in some areas but increase them in others. Asia came third in the list with 1,921,499 phones, or 4.51 per cent of all. This was due to the fact that Japan possessed 1,367,958 telephones, or 3.21 of the world total. Fourth was Oceania, with 1,008,221 instruments, 2.36 per cent of all world phones. The leading country in this area was Australia, having 661,996 stations, or 1.55% of all. South America was fifth in line, with 957,112 instruments, or 2.25 per cent of the world aggregate. An aggressive drive by the International Telephone and Telegraph Corp., as result of United States inter-

(Please turn to page 26)

Highlights of the Communications News

Important Communications developments of the past month, briefed for busy readers

by
ROLAND C. DAVIES
Editor, Telecommunications Reports

WITH the increasing nearness of the United States in actual participation in the War, regulatory activities of the Federal and State agencies and commissions in regard to the telephone industry of the normal type should become diminished while the industry's operations are more and more geared into the functions and needs of the military services.

In fact, the recently negotiated $14,000,000 reduction in interestate telephone toll rates between the American Telephone and Telegraph Co. and the FCC may be the last such major regulation of rates by the Federal Commission during the present emergency. This negotiated rate reduction terminated the FCC's plan for a series of lengthy hearings, due to start June 9, in which a sweeping investigation into not only toll rates but also methods of plant valuation, rate of return and separation would have been made. **The A. T. & T. — FCC rate reduction agreement contained a most significant provision for the Independent Telephone industry with the plan that the A. T. & T. would absorb the entire rate reduction in regard to the division of tolls and compensation for the connecting carriers—in other words the present division of tolls remain for the connecting companies.** (Detailed summary of the $14,000,000 reduction agreement appears on page 15).

Revision

WHILE the FCC may not engage in any more spectacular moves for rate reductions, it may institute some steps for the revision of the present Uniform System of Accounts for Telephone Companies which will be highly important for the Independent industry. It is considered possible that the problems of dividing the Class A telephone companies under the Uniform System into two groups so as to impose on the carriers with substantial revenues of $5,000,000 to $8,000,000 a year a more detailed accounting system than for the smaller companies. This matter will be brought up again before the National Association of Railroad and Utilities Commissioners convention during the latter part of the summer at St. Paul, Minn., and there seems to be a good chance that such a division of the Class A Companies, sought by the United States Independent Telephone Association, may be sanctioned.

Another FCC Decision

ANOTHER recent FCC development was the 4-2 decision to place under the Federal Commission's jurisdiction interstate interzone and interstate exchange rates in exchange district areas which cover two or more states. This decision was rendered in the case of the extended exchange district of the two Kansas Cities of the Southwestern Bell Telephone Co. The expansion of the FCC jurisdiction into this catagory of telephone rates may stir up a storm among state commissions as an invasion of their authority. (This FCC decision is reviewed at greater length in another portion of this column.)

Telegraph Merger

DESPITE two weeks of hearings before the Senate Interstate Commerce Committee, there appeared to be little likelihood of any action by Congress on the proposal for legislation to permit mergers in the telegraph industry, at least during the period of the present defense emergency. The recommendation of the FCC that the leased wires and teletypewriter exchange services of the A. T. & T. and Bell Systems should be transferred to the consolidated telegraph company met powerful opposition from the Army and Navy, as well as spokesmen for the A. T. & T. and telephone employees through their unions under the National Federation of Telephone Workers.

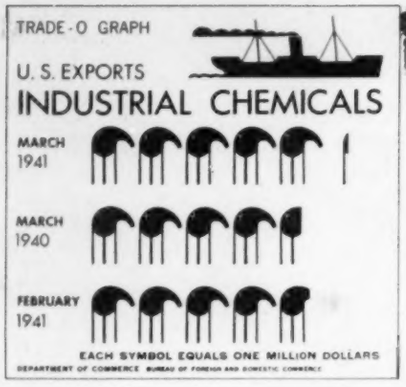
Taxes

THE most important subject for the telephone industry in Congress is the pending tax bill, now being drafted by the House Ways and Means Committee. As the **Telephone Engineer** goes to press there had been no determination by the Congressional framers of the tax measure as to the type and impact of the excise levies on telephone operations. The Treasury Department had proposed a greatly increased excise tax on the existing long distance telephone message levy and in addition a new excise tax of 5% on telephone bills. This had met opposition from two important New Deal spokesmen, Leon Henderson, Price Control Administrator, and Federal Reserve Board Chairman Marriner Eccles, as a type of excise which injured the general public. But in its search for the badly needed tax revenues to pay for the tremendous defense program, the House Committee may deem it desirable to follow the Treasury recommendations in regard to these telephone excise levies.

However, the House Committee did reject the Treasury proposal on the excess profits tax and voted to retain the present optional plans of two methods of computing this tax liability —the average earnings basis and the invested capital method. The average earnings basis is considered more desirable and imposing a lesser burden on smaller businesses so that this step if it should be enacted into the new tax law will be of importance for the Independent telephone industry. In regard to the personal income tax recommendations of the Treasury, Congress seems disposed to reject the greatly increased surtax program which would cause sharp rises for the income tax payers in the brackets from $2,000 to $10,000 a year.

Telephones in Defense

While the major part of the Army and Navy program of new encampments, bases and airfields have been built or are under construction, the peak of the drive for telephone facilities for these projects may have largely passed during the past twelve months. But there will undoubtedly be more such construction projects in the future so that the telephone industry will be called upon to perform the task of meeting further Army—Navy emergency requirements. The telephone industry, however, is well geared on the basis of its past experience to "carry on" with this job which it has fulfilled



with greater efficiency than probably any other American industry in meeting the defense tasks. In the existing camps and bases there may arise a need for expansion of the originally planned telephone facilities. There will be one special task for the telephone industry during the coming summer when it will be called upon by the Army to furnish facilities for the various maneuvers in different sections of the country. The Army uses a tremendous amount of leased wire and TWX service as well as regular voice telephone facilities during such training exercises and sometimes the telephone facilities are hard pressed to furnish such greatly increased requirements because Army maneuvers are usually conducted in the more sparsely populated areas of the Nation.

Emergency

UNDER the Unlimited Emergency Proclamation of President Roosevelt there is anticipated little, if any change in the status of the telephone industry. It was understood from most authoritative government sources that no developments affecting the telephone industry were planned by the President unless and until the emergency made them absolutely necessary. It was reiterated in important Army and Navy circles that the telephone industry was cooperating and coordinating its functions with the defense program in a most excellent fashion and that the prevailing government viewpoint was to retain private management and control without any disruptions except in the case of actual theaters of war.

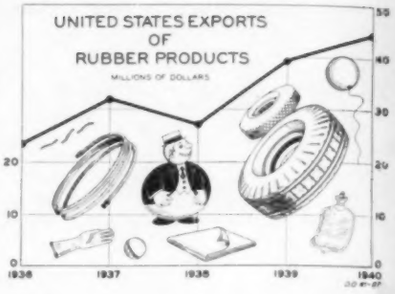
Construction

THERE has been a substantial construction of telephone toll facilities in strategic regions of the county to meet defense requirements and to give the best possible protection for telephone service in event of warfare. These construction projects have been mainly by the A. T. & T. and Bell System Companies and, while the most spectacular and largest was the twin cable transcontinental link from Omaha to Sacramento now nearing completion, a recent important addition to the long distance network was the $2,279,800 program to build a pair of cables, buried, between Boston and Maine away from the Atlantic Coast. Several Independent telephone companies have added to their toll plant to meet defense needs, among them having been the Carolina Telephone & Telegraph Co. and the Platte Valley Telephone Co. in Nebraska.

FCC Assumes Jurisdiction; Court Test Likely

A DECISION by the FCC of possible far-reaching significance which affects a large number of telephone exchange areas situated on state boundaries throughout the country and which may be interpreted as an invasion by Federal regulation into state commission jurisdiction was handed down recently when the Federal Commission by a 4 to 2 vote ordered the Southwestern Bell Telephone Co. to file with it before next June 30 the interstate interzone message rates and the interstate district exchange rates in that company's enlarged exchange district which covers the two Kansas Cities in Kansas and Missouri and their suburban communities.

The question of testing in the Federal courts the FCC decision to assume jurisdiction over telephone rates of this type is now being studied and there is a good possibility of a court appeal being taken. The strongly-worded dissenting opinion of Commissioners Case and Craven in which they contended the FCC had gone beyond the authority of Congress would form an excellent basis for a court test. This case which has been pending before the FCC for the past three years was launched on June 29, 1938, when the Commission ordered an inquiry into the concellation of Southwestern Bell tariffs which had previously been on file as interstate interzone message rates. A hearing was held in the fall of 1939 and then last fall an oral argument was staged at which the National Association of Railroad and Utilities Commissioners presented the opposition of the state commissions to the FCC's assumption of jurisdiction over interstate rates in an exchange area.



The four FCC Commissioners who supported the position that the Federal agency had jurisdiction over interstate exchange rates were Chairman Fly and Commissioners Wakefield, Walker and Thompson. The summation of their decision was contained in the following language:

"It should not be assumed that carriers subject to the Communications Act could, by merely changing the label on a particular class of service, bring such service within the exception in Section 221(b), thus eliminating the filing of rates. Under the provisions of Section 203 the present rates covering interstate telephone toll messages between zones in the Kansas City District Exchange Area, designated as 'message toll rates' in tariffs formerly on file with this Commission, and now designated as 'interzone message service' by the company in tariffs on file with the Kansas and Missouri Commissions, should be included in tariffs on file with this Commission, in accordance with the requirements of Section 203." (Section 221 (b) is the provision of the Communications Act which exempts from FCC jurisdiction any interstate wire telephone exchange service under state authority, and Section 203 is the provision requiring the filing of tariffs).

The FCC majority claimed that it had a broad grant of authority over interstate rates under the first two sections of the Communications Act. They stated in their opinion that Section 221 (b) which places exchange service under state jurisdiction "is an exception to, or limitation upon, this broad grant." The FCC majority continued that "giving it its broadest possible meaning, consideration of the definition of 'telephone exchange service' in Section 3 of the Act necessitates the conclusion that the service furnished under the interstate interzone message rates in the Kansas City

(Please turn to page 26)

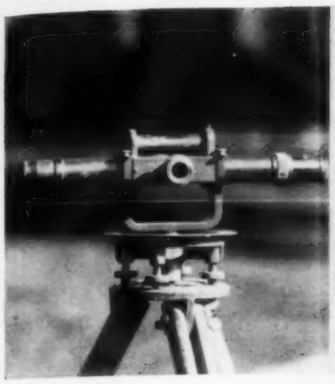
Convention Dates

California Independent Telephone Association, Miramar Hotel, Santa Monica, June 19 and 20.

Michigan Independent Telephone Association, Hotel Olds, Lansing, July 23 and 24. Golf day, July 22.

Telephone Section—Association of American Railroads, Hotel Gibson, Cincinnati, Ohio, Sept. 23, 24 and 25.

U. S. Independent Telephone Association, Stevens Hotel, Chicago, October 14, 15, 16, and 17.



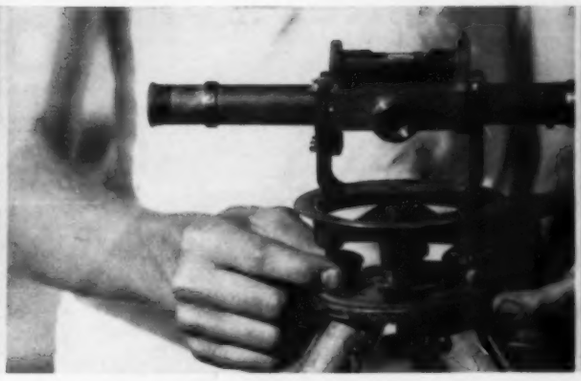


Fig. 5—Level-transit especially designed for telephone work. Fig. 6—Leveling the telescope. Fig. 7—Use of telescope in transit position.

Wire Chiefs TRAINING COURSE

(Prepared Expressly for TELEPHONE ENGINEER by the Lincoln Engineering School)

Pole Classification Methods

TELEPHONE and power poles are classified as to strength by what is known as the **numerical system.** This system of classifying wood poles was adopted in 1931 by the American Standards Association and replaced a former **alphabetical** method of designating pole strengths. A pole classification system is necessary in order to have some method of identifying poles in terms of sizes and strengths and so that pole lines can be engineered to be strong enough to withstand the storms that are likely to be encountered in a given locality but at the same time not be "over built" which would result in an uneconomical and wasteful use of pole timber.

The present numerical system of classifying poles is based on ten pole classes numbered from 1 to 10, 7 of the classes having a defined breaking load and minimum top and butt measurements. The other 3 classes are specified

CORRECTION

Through oversight and typographical transposition of figures several errors appeared in the pole line computation examples which appeared in Section III of the Wire Chiefs Course which was published in the May 15th issue. Those that are following the course should make the following corrective notations on the text.

Note # 1—Correct answer to Figure 4 example

$$Mw = 8 \times 20 \times .0924 \times 4 \times 200 = 11{,}827 \text{ lbs.}$$

$$Mp = 8\frac{21^2}{226.2}(2 \times 12 + 16) = 624 \text{ lbs.}$$

$$Mw + Mp = 11{,}827 + 624 = 12{,}451 \text{ lbs.}$$

$$C = \sqrt[3]{\frac{12{,}451}{.000264 \times 7400}} = 18.5 \text{ inches}$$

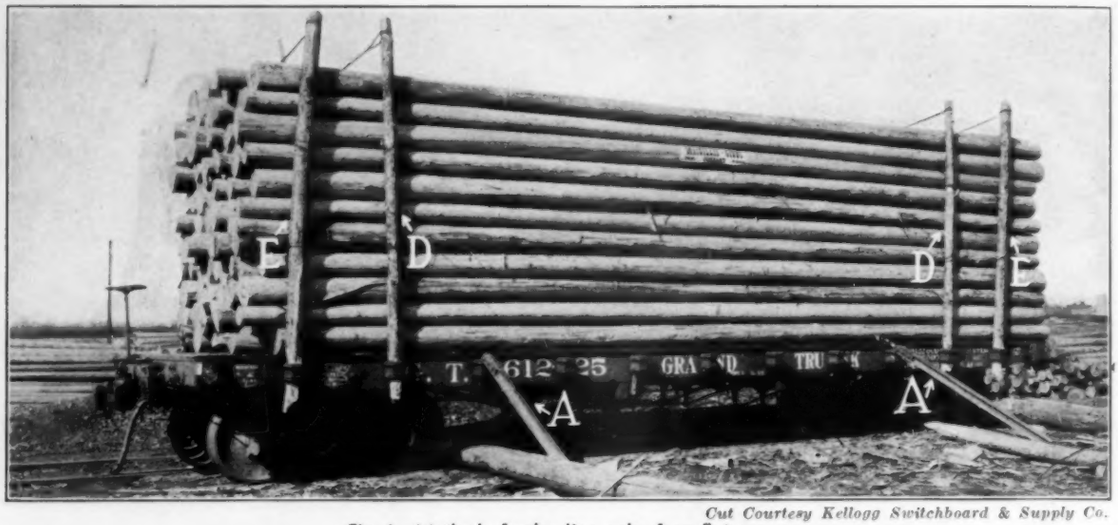
Note # 2—Table # 1 top page should have read:

{Heavy loading ice—0.50
{Medium loading ice—0.25

Note # 3—Formula under figure 7 should have read:

$$Mp = P\frac{h^2}{226.2}(2Ct + Cg)$$

Note # 4—The example given on page 34 was worked out on the slide rule. If the computations are worked out precisely a slightly different result will be obtained.



Cut Courtesy Kellogg Switchboard & Supply Co.

Fig. 1—Method of unloading poles from flat car.

in terms of top circumference only. All poles of a given class have the same breaking load regardless of type of timber or height of pole. For example, a Class 1 Northern White Cedar 25 foot pole is defined as one having a breaking load of 4500 pounds and a minimum circumference (6 feet from the butt) of 43.5 inches, and with a minimum top circumference of 27 inches. However, in a creosoted Southern Pine pole, a 25 foot, Class 1 pole would have a minimum butt circumference of 34.5 inches and a minimum top circumference of 27 inches. Due to the difference in fiber strength of the Northern White Cedar as compared to the creosoted Southern Pine, it takes a larger Cedar pole to give the same strength as the creosoted Southern Pine.

Defined Breaking Load

With this uniform method of classifying poles it is possible to compare poles of different woods directly and a quick cost comparison is thus readily made. With the former alphabetical method of designating poles, it was not so easy to compare different timbers.

The breaking load in pounds for the various timbers is given in Table No. 1. It should be noted that poles designated as Class 8, 9 and 10 are classified according to minimum top circumference only and are not rated as to breaking strength or butt requirements. These poles are used only for light loads such as two and four wire rural loads.

Pole Class	Defined Breaking Load (in Pounds)
1	4500
2	3700
3	3000
4	2400
5	1900
6	1500
7	1200
8	No Load Specified
9	
10	

Table No. 1—Breaking load in pounds for the Numerical method of classifying poles.

Specification Tables

FOR those who design and build pole lines the American Standards Association compiled tables giving pertinent data on various length and class poles and for the principal types of timber in common use. These tables give the minimum top and butt (taken 6 feet from bottom of pole) circumferences, and setting depth for poles in the ten classes. Tables Nos. 2, 3 and 4 cover Northern White Cedar, Western Red Cedar, and Creosoted Southern Pine.

These tables should be useful to the Wire Chief and Plant Manager in checking purchased poles to insure that they come up to standard specifications. This should be done at the time of unloading the poles from the cars.

Pole Line Design Table

The preceding section of the training course discusses methods for computing pole size to carry a given number of wires in a specific storm loading area. Table No. 5 which is based on these pole line design formulas is suitable for rough use and for tentative design information. This table shows the class pole required in the heavy loading area for different length spans and for one to thirty wire ordinary toll or rural lines.

Fig. 2 — Well arranged pole yard.

Pole Storage and Handling

AN IMPORTANT phase of the Plant Manager or Wire Chief's job is the unloading of poles from railroad cars and their subsequent handling and storage in suitable pole yards. Improper unloading methods may result in damaged poles and serious injury to the men engaged in this work. Pole yards if improperly maintained may result in the rotting of the poles in the yard.

Telephone poles are usually shipped on flat cars with the poles held in place by stakes on the car sides and with the tops of the stakes tied together with

(Please turn to page 32)

National and State Association NEWS

OVER 500 telephone men and women convened in Peoria, Illinois, May 28th and 29th for the annual convention of the Illinois Telephone Association. The keynote address of President J. I. Kennedy, Freeport, touched on all phases of the industry with a special warning against overbuilding plants which might later prove a loss. Necessity for increased rates was suggested as well as preparations for complete tariff filings that any type of service requested might be furnished.

Mr. Kennedy was re-elected president; L. R. Mapes, Chicago, vice-president; A. J. Parsons, Springfield, secretary-treasurer; and Ben B. Boynton, Springfield, general counsel. The convention re-elected the following directors: C. R. Brown, Springfield; Donaldson Coombes, St. Louis; E. D. Glandon, Pittsfield; Dr. R. E. Gordon, El Paso, J. G. Hardy, Springfield; Lon J. Jester, Rockford; H. A. Joslyn, Sycamore; Mr. Kennedy, Freeport; H. C. Langford, Chicago; R. A. Lumpkin, Mattoon; Mr. Mapes, Chicago; C. F. Melick, Eureka; W. O. Randall, Jacksonville; R. G. Roadstrum, Galesburg; Dr. J. G. Schwarz, Jerseyville; Earl F. Stice, Altamont, and R. B. Still, Bloomington.

The Illinois Convention is noted for its good business program and gracious entertainment. The 37th annual convention was no exception. The writer, enjoying his first visit among Illinois telephone men at the Peoria meeting, enjoyed this friendly get-together very much. The wholesome atmosphere of cordiality and hospitality was impressive.

The program was a well diversified one starting with the report of Secretary Parsons who gave a complete report of the associations activities during the association year. Mr. Kennedy then presented the president's annual address sounding the keynote of the meeting. His re-election to head the association for the coming twelve months was indeed a popular one.

Other speakers at the session were Ben B. Boynton and Lieut Col. Leland H. Stanford, Chicago, Signal Corps Officer for the Sixth Corps Area, who discussed "Commercial Telephone Service in Connection with National Defense."

James E. Gheen, New York, was a featured speaker provided by association officials to relieve the tedium of down-to-earth telephone matters and provided a mirth provoking interlude.

Louis Pitcher, Chicago executive vice-president of the U. S. Independent Telephone Association, outlined what is happening in communication matters nationally. Joint pole line construction was discussed by George H. Eck, Des Plaines. Other speakers included J. S. Chase, Chicago, on the subject of, "Maintenance of Small Exchanges." A skit with the title "Winning Public Favor" was presented by members of the Chicago traffic force of the Illinois Bell Telephone Company.

The staff of the TELEPHONE ENGINEER wishes to thank the association for the resolution commemorating the death of our late publisher and father, J. A. Smith. The association also passed a resolution on the death of Stanley R. Edwards, late editor of Telephony and the late Robert L. Parker of Geneseo.

The traffic conference under the association's traffic supervisor Mrs. Mayme Workman, got down to business immediately after opening session. In an interview with TELEPHONE ENGINEER Mrs. Workman stated that unprecedented traffic among many of the operating companies held down the attendance slightly during this conference. She remarked, however, that this was perhaps a healthy sign as good business needs good service.

Speakers heard on the traffic program were Mrs. Workman; G. C. Jones; R. M. Quirk; Miss Anne Barnes and L. F. Shepherd, general traffic superintendent, Commonwealth Telephone Company, Madison, Wisconsin.

Directors and officers of the Illinois Telephone Association smile for the cameraman at the recent convention, (L. to R.:) Seated—R. B. Still, Bloomington; Dr. R. E. Gordon, El Paso; J. I. Kennedy, Freeport; L. R. Mapes, Chicago; A. J. Parsons, Springfield; H. G. Langford, Chicago, and Dr. J. G. Schwarz, Jerseyville. Standing—C. F. Melick, Eureka; R. G. Roadstrum, Galesburg; Earl Stice, Altamont; J. G. Hardy, Springfield; C. R. Brown, Springfield; Donaldson Coombes, St. Louis, Mo.; Lon J. Jester, Rockford; W. O. Randall, Jacksonville, and R. A. Lumpkin, Mattoon. (Directors absent from the picture are E. D. Glandon, Pittsfield and H. A. Joslyn, Sycamore).

J. I. Kennedy, Freeport, president of Illinois Telephone Association, takes no chances in getting registration cards from USITA's Louis Pitcher and the association's own secretary A. J. Parsons at the recent convention.

WILLIAM E. LAWTON, Viroqua was re-elected president of the Wisconsin Association.

Wisconsin Convention

THE Wisconsin Telephone Association which convened in Madison, Wisconsin, on June 4 and 5, was one of its most successful conventions held in the past few years. The well rounded program included subjects on National Defense, Taxation, Commercial and Traffic subjects.

William E. Lawton, Viroqua, was re-elected to serve as president, as were the other officers which are Edwin M. Blakeslee, Madison, vice president; Alton H. Bowden, Almond, secretary; Joseph E. Byrne, Madison, recording secretary; and Chas. A. Blair, Boscobel, treasurer.

E. M. Blakeslee, J. J. Kuehn, Rhinelander, and H. Teasdale, Sparta, were re-elected as directors. Other directors are: Mr. Blair, Mr. Bowden, S. B. Lockwood, Mondovi; Mr. Lawton, R. W. Matteson, Black River Falls; F. M. McEniry, Milwaukee; F. H. Runkel, Madison; and E. B. Samp, LaCrosse.

The meeting was preceded by a golf-party on June 3 and a get-to-gether dinner following the golf party, at which time prizes were awarded. The annual banquet was held on the evening of June 5, the last day of the convention. The entertainment was so good that many out of the state visitors and manufactures' representatives suggested that recording secretary, Joseph E. Byrne, of the association should be publicly cited for his good work.

President Lawton, in his annual report and address, outlined a year of successful accomplishment and work of the association. He ended his remarks greeting a large number of new members that have joined the Wisconsin Association in recent months.

Others speakers heard during the convention were: Edwin M. Blakeslee; Mayor James R. Law, Madison; S. J. Gwidt, Rhinelander; Robert M. Rieser, Madison; Louis Pitcher of the National Association; Victor L. Short, New York; R. L. Hibbard, Madison; R. W. Peterson, Madison; W. E. O'Brien, Madison; John M. Smith, Madison; G. S. Kessler, Madison; F. M. McEniry, Madison, and Donald McGibeny.

The Traffic Conference was under the direction of Chairman L. F. Shepherd, Traffic Superintendent of the Commonwealth Telephone Company, Madison. Papers were read by G. J. Henterseher, Madison and Mrs. Mayme Workman, Springfield Illinois. A demonstration on Toll Tickets was given by Mrs. Ethel L. Reimer, and a playlet was presented by the employees of the traffic department of the Wisconsin Telephone Company. Cecelia M. Burke of the Commonwealth Company was in charge of the Open Forum for Questions and Answers.

It was a pleasure to meet with the Wisconsin telephone people this year and the Editor wishes to thank them for a most enjoyable and profitable visit. The speakers were excellent and their hospitality par-excellent. We were also gratified to hear of the number of new members that have joined the Association during the past months. And, may we add, our thanks to Mr. Lawton, Mr. Byrne and to Mr. Blakeslee in making our visit doubly interesting.

In a huddle at the Pennsylvania Independent Telephone Association's recent convention are, from L. to R.: F. J. Chesterman, John Wright, Harry Engh, H. O. Leinard.

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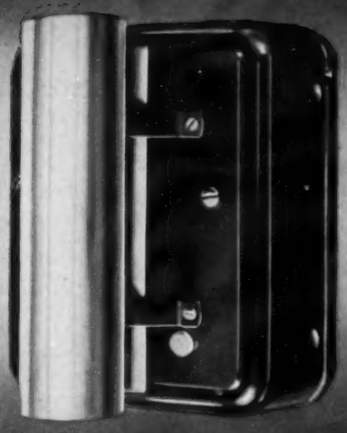

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Other similar "special service" ideas are suggested in the accompanying illustrations. Their promotion requires extra sales activity and effort, naturally—but this is more repaid by the additional revenue produced. You can file rates for such services without disturbing your regular schedule, and the extra income will help materially to bring your percentage of net to a more satisfactory level.

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An elastic, stretchable cord which neither kinks nor curls. Doesn't disturb papers on the businessman's desk.

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Permits holding one line while making a call over the other. Suggest the use of this telephone, by including it in wiring plans for various secretarial services.

The World's Telephones

(Continued from page 16)

est in Pan-America, will probably lead to a substantial increase in South American telephones in the future. Africa naturally came last in the list, with 430,699 phones, or 1.01 per cent of the world total.

The United States completed 30,300,000,000 telephone conversations in 1939, and sent 195,000,000 telegrams, the statistics show. Telephone conversations made up 99.4 per cent of total wire communications, with telegrams forming only 0.6 per cent of the total. The United States had 231.5 telephone conversations for each resident, and 1.5 telegrams per capita.

The United States as 1940 commenced had 95,150,000 miles of telephone wire or 53.12% of the world's total, and 2,300,000 miles of telegraph wire or 34.14% of the Globe's aggregate. The North American continent possessed 101,881,000 miles of telephone wire and 2,822,000 miles of telegraph wire. Europe had a total of 60,611,000 miles of telephone wire—33.84% of the world's amount and 2,244,000 telegraph wire miles or 33.31% of the total. Asia had 6,900,000 miles of telephone wire (3.85% of the total) and 932,000 miles of telegraph wire (13.83%); Oceania had 4,073,000 miles of telephone wire (2.28%) and 160,00 miles of telegraph wire (2.37%); South America had 3,874,000 miles of telephone wire (2.16%) and 373,000 miles of telegraph wire (5.54%); and Africa 1,771,000 miles of telephone wire (0.99%) and 206,000 miles of telegraph wire (3.06%). The total world telephone wire ran 179,110,000 miles, and there were 6,737,000 miles of telegraph wire.

Communications News

(Continued from page 18)

extended exchange area is not within the exception contained in Section 221(b). It is not 'intercommunicating service of the character ordinarily furnished by a single exchange and which is covered by the exchange service charge'."

The two dissenting Commissioners—Case and Craven—summed up their viewpoint that the FCC had no power over such interstate exchange rates in the following conclusion:

"Telephone service within a single metropolitan area, regardless of State lines, has been recognized by the Congress as a local problem. It is in fact a local problem, both technically and socially. Congress has further recognized the desirability of leaving the matter of local exchange rates in the hands of State or local authorities. There is nothing in this record which indicates the desirability of an attempt on the part of this Commission to inject itself into these purely local problems. The State Commissions concerned are satisfied of their authority to fix the charges for subscribers in their respective States. The company does not contest their jurisdiction. Hence the jurisdiction of the States is unchallenged. This Commission has no grounds whatsoever upon which to see to extend its authority beyond the plain intent of the Congress."

Urging that the investigation should be dismissed Commissioners Case and Craven in their strongly worded dissent pointed out that Section 221(b) had been suggested to Congress by the general solicitor for the National Association of Railroad and Utilities Commissioners and also "by a witness for the Iowa Independent Telephone Association." Since Congress wrote this Section into the Communications Act "it is not for this Commission (FCC) to question the action of Congress as being unwise or even unconstitutional." Citing that no distinction should be drawn between the flat rate charges for exchange service and the message rates between zones in the enlarged exchange area, the FCC declared that this Kansas City case was not a situation where the telephone company is seeking to deprive the FCC of jurisdiction over actual toll service 'between communities or cities through an unwarranted and wholly fictitious expansion of the exchange area beyond the limits consonant with any recognized measure of community interest. The Census Bureau provides a test for measuring community of interest as a basis of ultimate expansion of exchange areas. If and when the operating telephone companies seek to go beyond the accepted limitation of community interest adaptable for flat rate exchange service, we are in position to take whatever action may be appropriate at that time. This is not such a case, nor are we warranted in assuming that we will ever be faced with such a case. This history of exchange area development to date does not give color to such a possibility but rather negatives it. Expansion of an exchange area has heretofore coincided with or lagged behind (never preceeded) public demand and has always been well within the commonly accepted limits of metropolitan areas as defined by the Census Bureau."

Telegraph Merger Unlikely

ONE major factor in raising doubts as to the desirability of telegraph merger permissive legislation at this period of national defense emergency during the recent Senate Interstate Commerce Committee hearings was the general opposition to the FCC proposal for the transfer of the leased wire services and teletypewriter exchange service of the American Telephone and Telegraph Co. and Bell System to the projected consolidated telegraph company.

This opposition came in a most forceful fashion from the Army and navy in the statements before the committee by Major General Joseph O. Mauborgne, Chief Signal Officer of the Army, and Rear Admiral S. C. Hooper in charge of radio liaison for the Chief of Naval Operations. General Mauborgne, in particular, stressed that the Army was totally opposed to any such move because of the extensive and efficient service and use made by it of the Bell System's telegraphic facilities. He stated that the Army and the Civil Aeronautics Administration are now using these services in a very great volume and expect to extend and expand their utilization tremendously in event of war or intensification of the present emergency. He felt that it would be "most certainly inimical" to the War Department and the National Defense to shift these services to a merged telegraph company.

The views of the Bell System were presented by Charles P. Cooper, Vice President of the American Telephone and Telegraph Co. who felt that the present telegraphic services of the Bell System—more than three-quarters of the nation's leased wire service and the only teletypewriter exchange service with over 14,000 subscribers—ought not to be disturbed in any proposed Western Union-Postal Telegraph consolidation during the present defense emergency. The A. T. & T. and Bell System do not object to the merger legislation except that it should be on a permissive rather than a mandatory basis. Mr. Cooper felt that Congress should weigh in the transfer of leased wires and TWX the effects on the service to its customers and particularly upon the employees. Such a transfer, unless the telegraph merger should merely lease the facilities from the Bell System would precipitate a

difficult problem of readjusting the employees. He pointed out that the 6,000 Independent telephone companies were "far from unimportant" in the furnishing of these telegraph services over their facilities.

Strenuous protest against the proposals to transfer these services to the telegraph merger were voiced by the independent employees' unions. The National Federation of Telephone Workers through Bert Horth, Secretary Treasurer, representing 110,000 members in the Bell System declared that the transfer of TWX would mean a duplication of facilities greater cost to the public, lower grade service for a large class of telegraph users and unemployment or destruction of favorable working conditions for approximately 3,600 Bell System employees. John J. Moran, Chairman of the Federation of Long Lines Telephone Workers, declared that this transfer would retard the development of leased wires and TWX and in regard to the Bell System employees would result in definite losses of their wages and working conditions. The telephone workers if transferred to a telegraph consolidation would also become an "impotent minority" in the labor organization which would dominate that telegraph carrier. Charles H. Parsons, General President of the United Telephone Organizations, declared that the Bell System employees could not rely on legislative guarantees safeguarding their jobs.

J. A. Kennedy Named General Counsel of I.T.&T.

ONE of the ablest FCC officials, James A. Kennedy, Commission Assistant General Counsel in charge of telephone, telegraph and other communications services, has resigned from the FCC to become the General Counsel of the cable and radiotelegraph operating companies of the International Telephone and Telegraph Corporation. In accepting his resignation the FCC expressed great regret and high praise of his services.

It is expected that his successor will in all probability be selected from the present Commission legal staff and the two leading possibilities are Frank B. Warren and J. Fred Johnson. Mr. Warren has handled a number of important telephone cases while with the FCC including the Pacific Telephone and Telegraph rate reduction and the Kansas City exchange jurisdiction proceeding.

Mr. Kennedy becomes the General Counsel of the two Mackay Radio and Telegraph Companies, All America Cables and Radio, Commercial Cable Co. and Commercial Pacific Cable Co.

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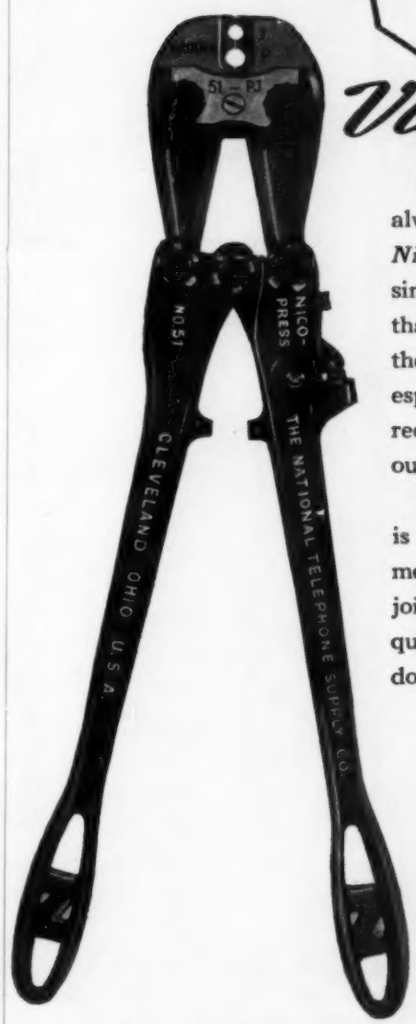
NICOPRESS SLEEVES and TOOLS



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Via GraybaR

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Line AND Desk

Inductive Interference

Q. When making a grounded line metallic in order to get rid of inductive interference from paralleling power lines will the fact that the existing wire is rusty and contains high resistance connections affect the amount of noise experienced from the inductive parallel?

A. It is not a good practice to combine rusty wire containing high resistance splices with a good wire in attempting to eliminate interference. If the telephone line is to effectively neutralize the induction from a power line it must be electrically balanced. This means with regard to the series resistance of the two wires and the leakage to ground. If the existing wire is extremely rusty it should be replaced if at all feasible, and if not, it should be given a thorough resistance check so as to locate all bad splices which should be removed and replaced with soldered or compression type splices.

Q. What is meant by the term "ground return current"?

A. This represents the current which passes from the power source out over the power line and returns to the source through the ground. It is this current that is largely responsible for noise in inductive parallels.

Poles and Open Wire

Q. What is the preferred practice for dead ending guys on the pole.

A. Either the eye-bolt method or the wrap around method is permissible and there is some lack of general agreement on this point among engineers. The author has always favored the wrap around method because it seems to be somewhat more conservative but many authorities take the other position.

Q. What is the usual requirement for telephone wire clearance over public highways?

A. The National Electric Safety Code specifies 18 feet, however, there are a few states that have state laws that specify as much as 20 feet clearance above the highway. State laws should be consulted and followed in this regard.

Central Office

Q.—Please furnish us with a circuit suitable for testing switchboard plugs and cords on the repair bench.

A. A simple circuit used by some companies is shown in Fig. 1. It

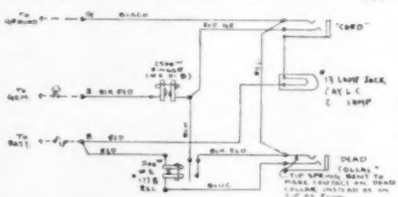

Fig. 1—Switchboard plug and cord testing circuit.

consists essentially of two jacks, one switchboard lamp, one ringer and one relay connected as shown. This circuit is not suitable for testing switchboard cords in place on the switchboard. The following tests can be made. Test No 1—Insert cord in plug jack. If T and R are crossed the ringer will operate. If T and S are crossed the lamp will light. If R and S are crossed the ringer and lamp will both operate. Test No 2—To test for open conductors cross cord tips T and R, T and S and R and S respectively and indications as described in test 1 should be obtained. Test No. 3—To test plugs to see if dead collar is crossed with the ring of the plug, insert the plug in the dead collar jack and the ringer will operate if the dead collar is crossed with the ring of the plug.

Q. What is the circuit of a typical 30 volt one-half ampere tungar type charger.

A. The charger is shown in Figure 1.

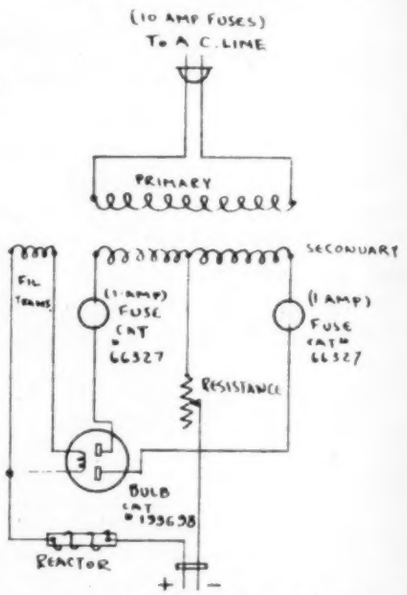

Fig. 1—Typical circuit of 30 volt-½ ampere tungar charger.

Transmission

Q. What is the purpose of so called capacity unbalance tests that are made on toll cables?

A. Where quadded pairs are used for toll purposes and where the cables have appreciable length it is desirable to balance the capacity between the several wires of the quad itself as well as the capacity between quads. This reduces the amount of noise and cross talk which would otherwise result. This is accomplished by measuring the unbalanced capacity of the various quads and then connecting the quads extending in opposite directions in such manner that unbalances in one direction are neutralized by similar unbalances but of unlike sign.

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Features of the No. 120 P.B.X. Appreciated by the Modern Office:

1. Connects with any Central Energy Exchange —either manual or dial through jack-ended trunks.
2. Wiring is provided for the following choice of service:
   (a) P.B.X. station after hanging-up is protected against direct re-rings from the central operator.
   (b) P.B.X. station can flash the P.B.X. operator to transfer the call without lighting the disconnect signal at central office.
3. All trunk calls are answered with the calling cord.
4. Each cord circuit is equipped with ringing key, ring-back key, listening key, dialing key *when required,* through dialing and night connection key.
5. Reverting Ringing Tone informs calling party that the operator is ringing.
6. Linoleum is used for Kick Mat and for lining of cord compartment.
7. Individual jacks are used in all line and trunk circuits.
8. Keyboard is hinged at left end so as to permit continuing full operation while raised.
9. Coils, relays, and capacitors are on a relay gate which swings horizontally from a rigid self-supported steel frame.
10. Operator's Breast Telephone is employed with concealed jack.

The No. 120 P. B. X. SWITCHBOARD

The equipment is housed in a streamlined cabinet, strikingly veneered in two-tone genuine walnut so as to be in keeping with any fine office furniture. The rich appearance of the Sun Tan face and keyboard, contrasted with the dark brown of the plugboard, is highlighted by the rich brass fittings.

Overall dimensions: Height, 3′ 9⅝″; Width, 2′ 1⅛″; Depth, 2′ 8″. Wiring and Capacity: 80 lines, 15 cords, and 15 trunks.

The No. 121 CORDLESS P. B. X. SWITCHBOARD

Here is a switchboard of which any office would be proud. Exposed wood surfaces are beautifully finished with two-tone genuine walnut veneers so as to harmonize with fine office furniture. Panels are flush, corners rounded. The apparatus panel is covered with Sun Tan Phenol Fibre veneers. Key handles are of fine plastic, colored in pleasing shades to designate circuit functions.

Overall dimensions: Length, 2′ 2¾″; Height, 1′ 2″; Depth, 1′ 2¾″. Wiring and Capacity: 16 lines, 5 trunks, and 5 connecting circuits.

odern offices demand up-to-date equipment. Typewriters, typeriter desks, bookkeeping machines — all are streamlined and proved in appearance. That's why the Stromberg-Carlson No. 120 d No. 121 Switchboards make sales of P.B.X. service easier for erating companies. These boards answer the demand for someing modern in appearance, modern in efficiency, harmonious with lay's decorative schemes. They are making new P.B.X. sales cords for operating companies everywhere.

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A Novel Toll Line Switching Circuit

ON some long distance circuits it is often desirable to keep two lines tied together through the intermediate toll switchboard so that they may be separated when the occasion demands. Where transmission needs require the loss be kept within narrow limits both on terminal and through connections, a combination of pads can be used to advantage for this purpose. For example, assume we have two toll lines composed of carrier circuits each of which must be maintained at 10 DB equivalent on terminal calls and 10 DB overall when the two are connected together. Each carrier circuit can be lined up for zero equivalent and a 5 DB pad installed between the carrier terminal and the switchboard so arranged that it can be cut out. A convenient way to do this is to install two jacks on the switchboard, one jack being ahead of the pad. In this way, connections can be put up either with or without the pad in the circuit.

Where two lines are normally kept tied together it is necessary to code ring the intermediate station. In busy offices this is somewhat of a disadvantage and the circuit shown in Fig. 1 has been worked out to eliminate this difficulty. In effect, the circuit provides selective ringing so that the intermediate switchboard will get a lamp indication only when its code ring is received; in addition, the indication will show on what circuit the call originates. For example, the Figure shows an installation at Baton Rouge for two carrier circuits one of which extends to Shreveport, the other to New Orleans. A code selector (described in the June, 1940 issue of **Telephone Engineer**) is used to obtain lamp indication when Baton Rouge is called, lamp 9 indicates a call from New Orleans and lamp 10 from Shreveport. Normally the two circuits are tied together as the majority of calls are between New Orleans and Shreveport. The code selector is set to respond to one short and one long ring.

The operation is as follows: Assume a call for Baton Rouge originating at Shreveport, who rings one short and one long. When the ringing signal appears at Baton Rouge, the relay contacts on the carrier terminal operate, closing the circuit to relay 3 which in turn closes contacts operating relay 4. Relay 3 is a fast operate fast release type. Relay 4 has a condenser resistor arrangement whereby it is fast operate slow release. When relay 3 closes it applies 3 volt battery to the code selector and 120 volt battery to

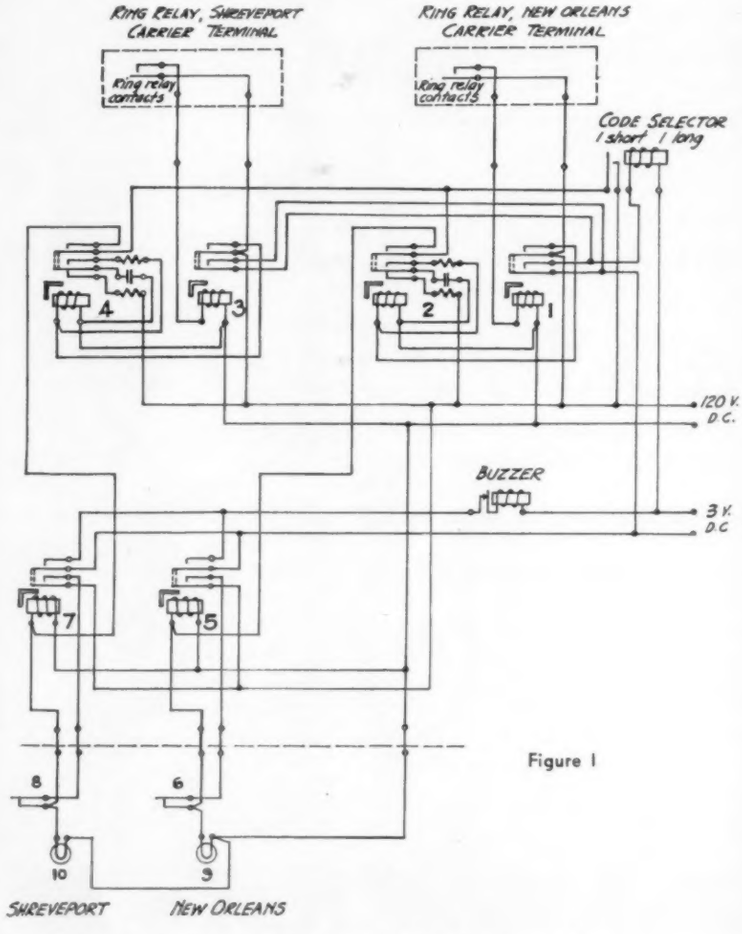
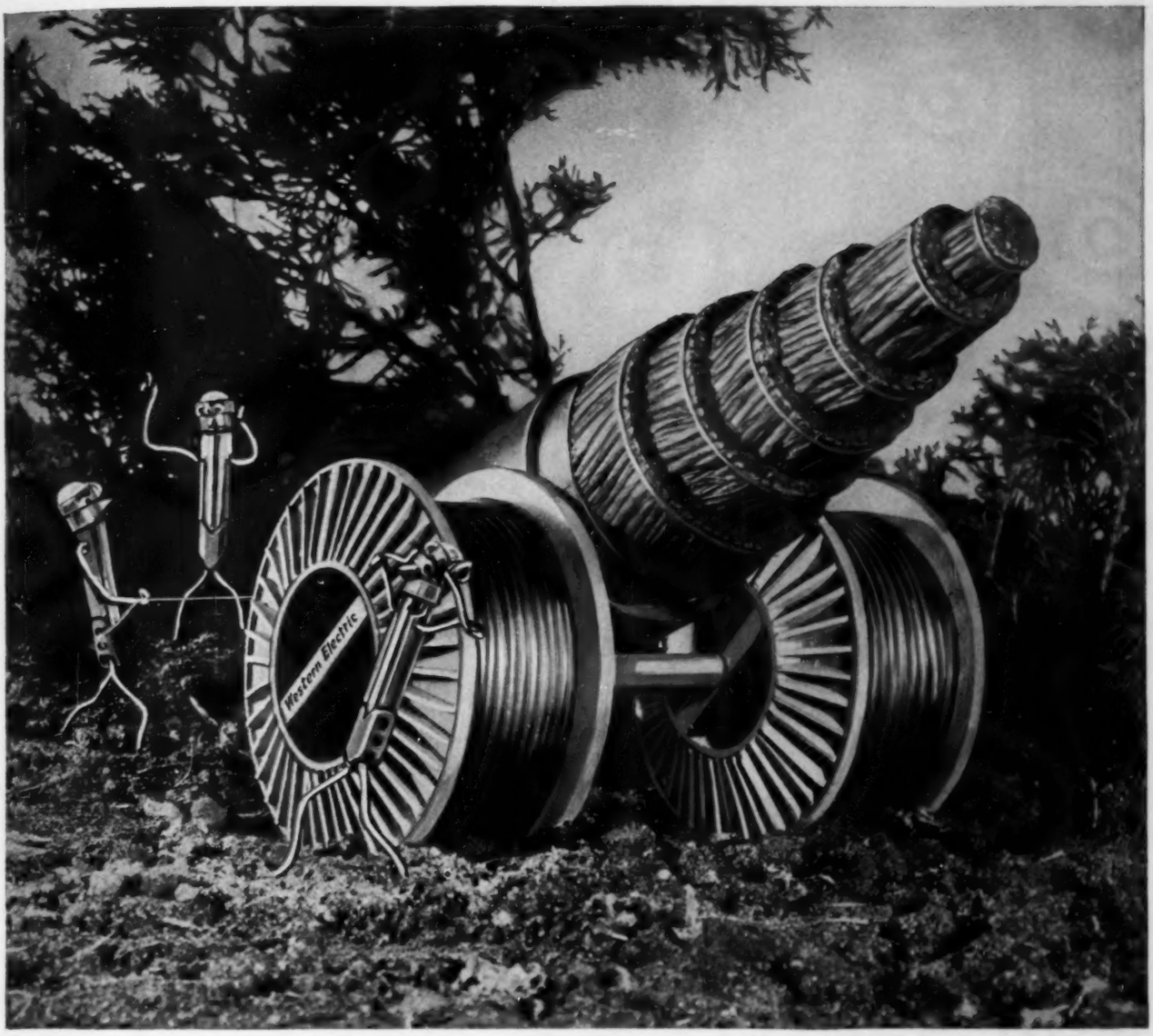


Figure 1



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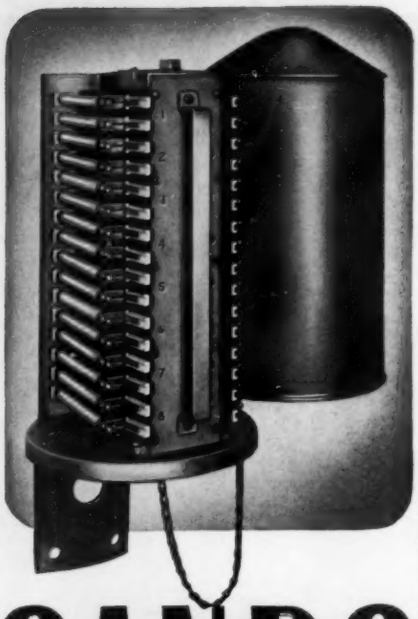

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relay 4 which closes instantly and releases slowly. The code selector upon receiving the short and long signal operates the circuit through the contacts of relay 4 to relay 7. Relay 7 locks up and closes the circuit to indicating light 10 on the switchboard. When the operator answers, contact 8 on the switchboard opens thus releasing relay 7.

Calls originating at New Orleans operate relay 5 in a similar manner to that described above. A buzzer is provided operating through the contacts of relays 5 and 7 to give an audible signal in case the operator is busy with other work.

On through calls, New Orleans rings Shreveport with one ring likewise Shreveport rings New Orleans with one ring. As the code selector to one ring does not respond there is no indication on the switchboard at Baton Rouge. The adjustment of the relays is very simple as it is merely necessary to make the time delay on relays 2 and 4 sufficient to allow for the code selector to operate. This makes about ½ second after completion of the ringing signal. With the condenser resistor combination shown it is readily possible to obtain a time delay over one second thus allowing ample margin.

Wire Chief's Course

(Continued from page 20)

wire. One popular method of car unloading is as follows:

First place wooden skids between the car and ground. Next, place a heavy rope sling around the poles at each end of the car as shown in Figure 1. Tie one end of the rope to the side of the flat car and the opposite end should be snubbed around the other side of the car so that the load can be held by a man on each rope. Then remove the center stakes by cutting the wire and

Pole Class		1	2	3	4	5	6	7	8	9	10
Min. Top Cir. in Inches		27	25	23	21	19	17	15	18	15	12
Length of Pole in Feet	Setting Depth in Feet	Minimum Circumference at Point Six Feet from Butt (Inches) for each Pole Class									
		1	2	3	4	5	6	7	8-9-10		
16	3½	—	—	—	—	26.0	24.0	22.0			
18	3½	—	—	—	32.5	30.0	28.0	25.5	23.5	No Butt	
20	4	39.5	37.0	34.0	31.5	29.0	27.0	25.0	require-		
22	4	41.0	38.5	36.0	33.0	30.5	28.0	26.0	ment		
25	5	43.5	41.0	38.0	35.5	32.5	30.0	28.0			
30	5½	47.5	44.5	41.5	38.5	35.5	33.0	30.5			
35	6	50.5	47.5	44.0	41.0	38.0	35.0	32.5			
40	6	53.5	50.0	46.5	43.5	40.0	37.0	—			
45	6½	56.0	52.5	49.0	45.5	42.0	—	—			
50	7	58.5	55.0	51.5	47.5	44.0	—	—			

Table No. 2—American Standards Specifications for Northern White Cedar Poles—3600 Pounds.

Pole Class		1	2	3	4	5	6	7	8	9	10
Min. Top Cir. in Inches		27	25	23	21	19	17	15	18	15	12
Length of Pole in Feet	Setting Depth in Feet	Minimum Circumference at Point Six Feet from Butt (Inches) for each Pole Class									
		1	2	3	4	5	6	7	8-9-10		
16	3½	—	—	—	—	23.0	21.5	19.5			
18	3½	—	—	28.5	26.5	24.5	22.5	21.0			
20	4	34.5	32.0	30.0	28.0	25.5	23.5	22.0	No Butt		
22	4	36.0	33.5	31.5	29.0	27.0	25.0	23.0	require-		
25	5	38.0	35.5	33.0	30.5	28.5	26.0	24.5	ment		
30	5½	41.0	38.5	35.5	33.0	30.5	28.5	26.5			
35	6	43.5	41.0	38.0	35.5	32.5	30.5	28.0			
40	6	46.0	43.5	40.5	37.5	34.5	32.0	—			
45	6½	48.5	45.5	42.5	39.5	36.5	—	—			
50	7	50.5	47.5	44.5	41.0	38.0	—	—			

Table No. 3—American Standard Specifications for Western Red Cedar Poles—5600 Pounds

pulling out the stakes. Finally the men at each end of the car cut off the two remaining stakes and as soon as they are in the clear, the two ropes are paid out so as to lower the poles slowly to the ground. All the poles should then be rolled out on the pole skids provided so that they can be handled and loaded on trailers for transportation to the pole yard.

Pole Yard

INASMUCH as telephone poles are generally purchased by the car load and that it is customary to carry a number of poles in stock for use of replacement during storms or for small extensions, it is necessary that adequate storage facilities be available. The storage yard should preferably be located on level ground with good drainage and should be kept free from weeds, rotted wood, and other sources of possible infection to poles. If cinders can be obtained at a reasonable price, an improved condition can be obtained by spreading a two inch layer of cinders over the yard. It is generally desirable to place a wire fence around the yard to insure that poles and other material cannot be easily stolen. Poles should be piled on creosoted timbers or poles as shown in Fig. 2-A. Where space is a factor the use of 2½ inch pipe set in the ground as shown will permit storing a greater number of poles in a given space. Note the use of 2 x 4 strips between poles to insure good air circulation. Under no circumstances should weeds be allowed to grow up around the poles. If cinders are used, this will of course largely take care of the weed problem.

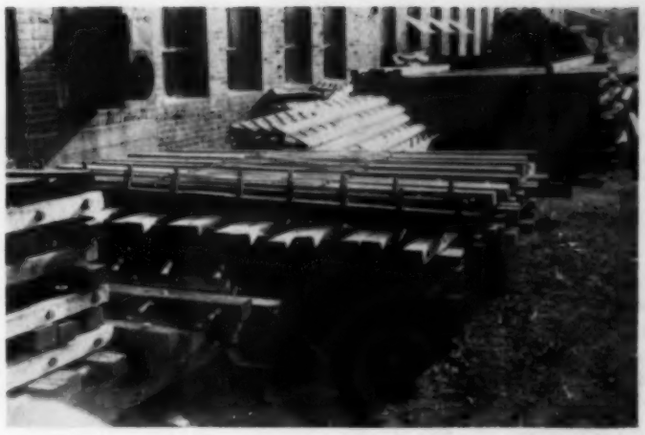

Fig. 3 — Proper stacking of crossarms in yard to prevent rotting.

The poles yard is also useful for storing other heavy materials such as cross arms, anchors, cable rails, etc. Cross arms should preferably be placed under cover and should be properly stacked as shown in Fig. 3 so that air can circulate freely thru the pile.

Laying Out the Pole Line

THE several steps in pole line construction are: (1) selection of the pole line route, (2) design of line for adequate strength, (3) preparation of sketch showing routing and materials required in each mile, (4) staking out of the line, and (5) the line construction.

In the selection of the pole line route an effort should be made to pick a roadside that will offer the greatest freedom from tree interference and one that will avoid the necessity for the line frequently changing roadsides. The highway department should be consulted to determine the possibility of road widening projects or corner changes that might affect the location of the line. The pole design computations, which have for their purpose the selection of the most economical pole which will offer reasonable security against the average storm, have already been discussed in Section III of this course.

A **working sketch** should be drawn up showing the route selected and the number of poles, crossarms, and amount of wire required in each mile.

The next step is to "line up and stake out the lead". The lining up process can be accomplished by either the use of a surveyors level in conjunction with a range rod or by simple sighting across several range rods. The location of the pole line with respect to the center line of the highway will depend on various conditions. Where there is a possibility of the highway department grading out poles which are set outside of the property line, that is, on the highway, it is advisable to purchase easements so that the poles can be set one or two feet inside the property line, hence when due to widening of the highway it is necessary to move poles, it is up to the highway department to stand the moving cost. In any event on important lines, it is generally worthwhile to hire a county or State Surveyor to determine the highway boundaries and property lines so that the poles can be set in the desired location.

Lining Up the Lead

THE staking operation itself can best be accomplished when range rods are used by three men, two of which carry the measuring tape and the third "sights in" and drives stakes. In this process man

Pole Class		1	2	3	4	5	6	7	8	9	10
Min. Top Cir. in Inches		27	25	23	21	19	17	15	18	15	12
Length of Pole in Feet	Setting Depth in Feet	Minimum Circumference at Point Six Feet from Butt (Inches) for each Pole Class									
		1	2	3	4	5	6	7	8-9-10		
16	3½	—	—	—	—	21.5	19.5	18.0			
18	3½	—	—	26.5	24.5	22.5	21.0	19.0	No Butt		
20	4	31.5	29.5	27.5	25.5	23.5	22.0	20.0	require-		
22	4	33.0	31.0	29.0	26.5	24.5	23.0	21.0	ment		
25	5	34.5	32.5	30.0	28.0	26.0	24.0	22.0			
30	5½	37.5	35.0	32.5	30.0	28.0	26.0	24.0			
35	6	40.0	37.5	35.0	32.0	30.0	27.5	25.5			
40	6	42.0	39.5	37.0	34.0	31.5	29.0	27.0			
45	6½	44.0	41.5	38.5	36.0	33.0	30.5	28.5			
50	7	46.0	43.0	40.0	37.5	34.5	32.0	29.5			

Table No. 4—American Standards Specifications for Creosoted Southern Pine—7400 Pounds

No. Tel. Wires	Pole Class and Span Length					
	100	130	150	175	200	250
1-4	10	9	9	8	7	7
5-10	10	8	8	7	7	6
11-14	9	8	7	7	7	6
15-20	8	7	7	6	6	5
21-27	7	7	7	6	5	4
28-30	7	7	6	5	4	4

Table No. 5—Recommended Pole Sizes for Short Haul Toll and Rural Lines—Heavy Loading Area

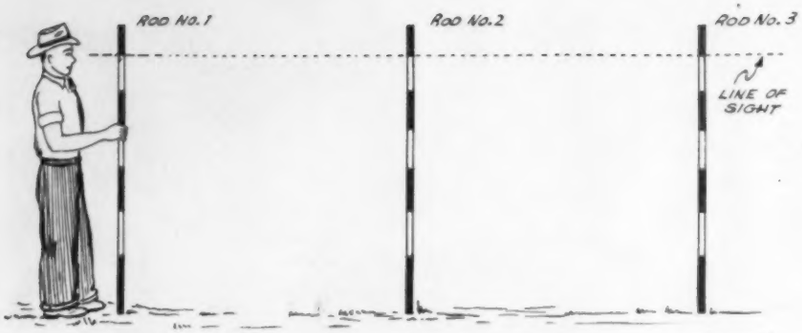

Fig. 4—Lining up pole lead with three range rods.

No. 1 and No. 3 set up their rods on points known to be in line with the lead. Man No. 2 moves his rod until it is in line with rod No. 1 and No. 3 and is sighted in by man No. 1 who drives down a stake at the starting point. Man No. 2 and No. 3 move ahead one span length and man No. 1 moves up to the position occupied by man No. 2 and then sights thru to the rod held by man No. 3 which is moved into the line of sight. Both man No. 1 and No. 3 can carry a bag of stakes and take turns staking. In this way a greater distance can be covered without the necessity of going back after stakes. Fig. 4 illustrates this method of lining up a lead.

Use of Telephone Level-Transit

INEXPENSIVE combination level-transits are available which are quite useful in telephone construction work. A typical level of this type which is available at less than $50.00 is shown in Fig. 5. In using an instrument of this type for simple staking operations, proceed as follows:

First, locate the two corner stones at section and half section points. Measure from these known points back to the property line or to whatever line on which the poles are to be placed. Set up the level using a plumb bob attached to the center of the telescope bed plate to accurately center the instrument over one of the established points. Be sure the tripod legs are pressed firmly into

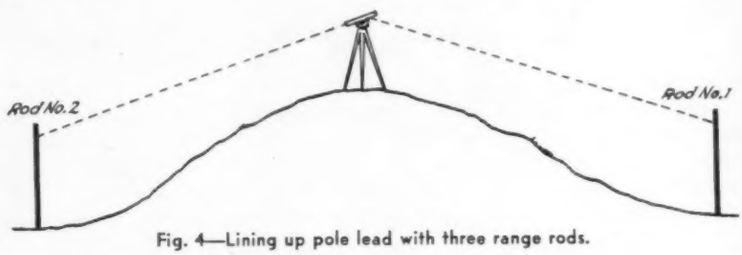

Fig. 4—Lining up pole lead with three range rods.

TELEPHONE ENGINEER *Handbook Tables*

by B. C. Burden

File—Electrical Theory
Date .....

Subject: *Electrical Abbreviations and Symbols*

ABBREVIATIONS AND SYMBOLS

Admittance	Y	Kilowatt	Kw
Alternating Current	a.c.	Magneto Motive force	F
Ampere	I	Magnetic Flux	Φ
Antenna	ant.	Magnetic Intensity	H
Angular Velocity (πf)	ω	Megacycle	Mc
Audio Frequency	a.f.	Megohm	MΩ
Capacity	C	Microfarad	ufd
Conductance (mhos)	G	Micromicrofarad	uufd
Decibel	db	Milliampere	m.a.
Dielectric Constant	K	Millivolt	m.v.
Direct Current	d.c.	Milliwatt	m.w.
Electromotive force	e.m.f	Mutual Inductance	M
Energy	W	Ohm	Ω
Flux Density	B	Permeability	u
Frequency (cycles)	f	Plate current	Ip
Grid voltage	Eg	Plate voltage	Ep
Grid current	Ig	Power (watts)	P
Ground	gnd	Power factor	p.f.
Henry	h	Radio Frequency	r.f.
High Frequency	h.f.	Reactance	X
Impedance (ohms)	Z	Reluctance	R
Inductance (henries)	L	Resistance (ohms)	R
Intermediate Frequency	i.f.	Susceptance	b
Kilocycles	KC	Volts	E
Kilovolt-ampere	KVA	Watts	W

CONVERSION FACTORS

Ampere	=1,000,000 microamperes
Ampere	=1,000 milliamperes
Farad	=1,000,000,000,000 micromicrofarads
Farad	=1,000,000 microfarads
Henry	=1,000,000 microhenrys
Henry	=1,000 millihenrys
Kilocycle	=1,000 cycles
Kilovolt	=1,000 volts
Kilowatt	=1,000 watts
Megacycle	=1,000,000 cycles
Megohm	=1,000,000 ohms
Mho	=1,000,000 micromhos
Microampere	=.000,001 ampere
Microfarad	=.000,001 farad
Microhenry	=.000,001 henry
Micromho	=.000,001 mho
Micromicrofarad	=.000,000,000,001 farad
Milliampere	=.001 ampere
Millihenry	=.001 henry
Millimho	=.001 mho
Milliohm	=.001 ohm
Millivolt	=.001 volt
Milliwatt	=.001 watt
Watt	=1,000,000 microwatts
Watt	=1,000 milliwatts
Watt	=.001 kilowatt

EQUIVALENT UNITS

1 kilowatt=1000 watts
1 kilowatt=1.34 H.P.
1 kilowatt=44,257 foot-pounds per minute
1 horse power=746 watts
1 horse power=33,000 foot pounds per minute
1 B.t.u. (British Thermal unit)=778 foot-pounds
1 B.t.u=0.2930 watt-hour
1 joule=1 watt-second

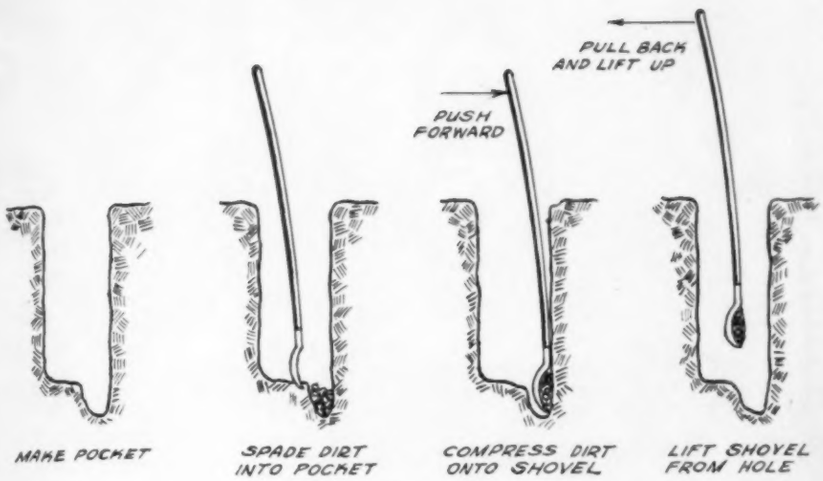

Fig. 9—Pole Hole Digging Methods.

the earth to prevent subsequent movement.

Next level the instrument. This is accomplished by setting the telescope so that it is over one set of adjustment screws, which are then turned until the bubble shows the telescope to be level. The telescope is then swung thru an arc of 90 degrees so that it is over the second set of adjustment screws which are then adjusted so that the bubble shows the telescope to be level over this set. Next swing the telescope back over the first set of screws and note whether it is still level, if not it should be given a slight adjustment so that the bubble shows the telescope to be level regardless of setting. Fig. 6 illustrates how the instrument is leveled.

After the telescope has been leveled sights can be taken on the distant range rod. In level country the instrument can be used in the level position, or if this is not practical due to hills and rolling ground, the telescope should be removed from the Y and changed to the transit position. Fig. 7 shows the telescope in the transit position. When the distant rod has been sighted lock the Y in position and signal the rodman to move back to the next pole location which is determined by chaining the correct span length and then moving the range rod at right angles until it is in the line of sight.

After the pole has been located the rodman drives down a stake and moves to the next pole location. Stakes should show the length pole required. The rodman should be careful to provide adequate height poles at road crossings, driveways, entrance to farmers fields, etc.

When it is difficult, if not impossible, to sight thru intervening trees or brush, the pole locations are sighted along the side of the adjacent road and then transferred over to the correct location with a tape.

To avoid the possibility of the instrument being thrown out of alignment due to jarring and thus causing all subsequent measurements to be in error, it is customary to leave a range rod at the distant end of each section and to check back against this rod occasionally while proceeding with the location of the intermediate points.

Where it is impossible because of the hilly character of the land to sight between the two points which are used to fix the pole line location, the level should be moved to the high ground lying between the two points which establish the pole line location and then shifted back and forth at right angles to the line of sight until it is on the direct line between range rods set up at the two points. Fig 8 illustrates this set up. The procedure is as follows: Set up the telescope at a point thought to be in line with the two range rods. Level the instrument, then change the telescope to the transit position. Sight in one of the distant rods, then with the swivel locked, reverse the telescope in the Y and take sight on the other rod. Note whether the sight falls to the right or left of the second rod and then move the instrument so as to bring it in line. Each time the instrument is moved it must be releveled. When it is known to be in line with the two rods staking can proceed in the manner heretofore described, except that the instrument is used as a transit.

In addition to its use in lining up poles, the convertible type of level just mentioned can also be used in laying out conduit jobs.

Pole Hole Digging

IT would seem that the subject of pole hole digging is too simple to require much explanation, however, as every telephone man who remembers his first pole hole will agree, real technique is required to dig a suitable hole with a minimum of time and effort. Inasmuch

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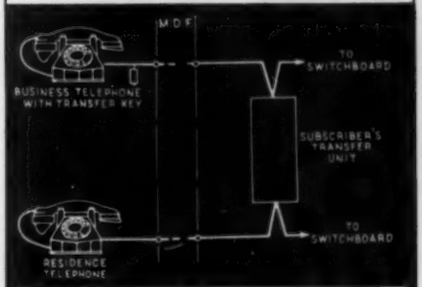

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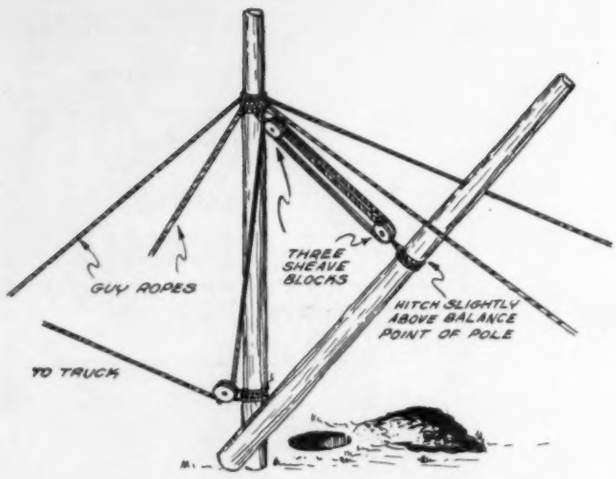
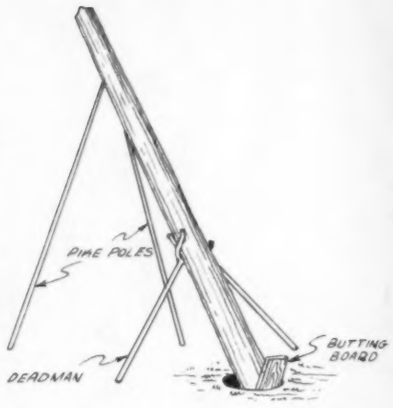


Left—

Fig. 10—Use of Gin pole to raise large poles.

Right—

Fig. 11 — Raising a large pole with pikes and deadmen.



as this course is intended for a general training program, it is advisable to discuss briefly digging tools and methods.

Essential digging tools are a spoon for removing dirt, a straight handled digging shovel, spud bar for hardpan, and a round point shovel for miscellaneous digging and back filling.

The digging procedure is as follows: The first foot or so of the hole is generally started with the round point shovel, after which the straight digging shovel is jabbed forcefully into the ground so as to loosen the dirt. The loosened dirt is worked into a pocket which is maintained on the side of the hole away from the digger. The dirt is compressed on the shovel by pushing the shovel handle forward and the shovel can then be lifted from the hole with the dirt sticking to it. It is essential that the dirt is pressed on the shovel so that it will stick together in a compact mass as the shovel is raised from the hole. Reference to Fig. 9 will disclose just how this is handled. In exceptionally dry ground it may be necessary to use the spoon to remove dirt from the hole, however, in holes from 3 to 5 feet deep it is generally possible to get along without a spoon. The sides of the hole should be kept straight and the hole should be amply large so that the tamping bar can be easily used all around the pole.

Pole setting depths vary in different parts of the country, depending on the nature of the soil. In general however, the following depths are considered standard for telephone holes.

Pole Length in Feet	Hole Depth in Feet
16	3½
20 small	3
20 large	4
25 small	4
25 large	5
30	5½
35	6
40	6
45	6½
50	7

Erection of Poles

IN constructing a pole line it is customary to dig only as many holes per day as are required by the pole setting crew, as an open hole, if left over night, is a hazard to the public and might result in an accident with a consequent damage suit. Erection of telephone poles requires pikes, a deadman, and several tamps. Sixteen foot poles, as well as the smaller 20 and 25 foot poles, can usually be set without the necessity of pikes. Poles 25 foot and larger, particularly in the larger classes, require the use of pikes and in some cases a deadman.

Where it is necessary to set an unusually high pole, for example a 45 or 50 foot, particularly with a small gang, it may be necessary to set a 16 or 20 foot gin pole arranged as shown in Fig. 10. Gin poles need to be set in the ground only 1½ to 2 feet and should be temporarily guyed with ropes. A three sheave block and tackle should be attached to the top of the gin pole and the fall line brought down to a pulley near the base of the pole, and the pole should then be lifted into position by attaching a truck to the fall line. When poles are large enough to require pikes for their erection proceed as follows:

Move the pole butt into position directly over the hole and against a short length of 2x6 which is stuck in the hole and serves as a butting board. Several men should then elevate the pole to a position off the ground where pike poles and deadmen can be placed as shown. It is often advantageous to use two deadmen instead of one as by placing them at an angle with the pole on each side, it minimizes the possibility of the pole slipping off the pike poles. With a man on each pike and deadman, the pikes are raised and at the same time the deadmen are moved forward. During this operation, care should be taken to insure that the butt end of the pole slips into the hole properly. When the pole drops into the hole, the men on the pikes must exercise care to pull the pike away from the pole at the right time to avoid possible injury due to the pike being jerked out of their hands. Fig. 11 illustrates the use of deadmen and pikes.

WIRE CHIEF'S EXAMINATION No. 4
Pole Line Design & Construction

1. **Why is a pole classification system necessary?**
2. **Explain briefly the numerical system of pole classification.**
3. **Will a 25 foot class 5 Southern pine pole have the same or a different breaking strength than a 25 foot class 5 white cedar pole?**
4. **What are the minimum top and 6 foot from butt measurements of a class 3, 40 foot northern white cedar pole?**
5. **What precautions should be observed in unloading poles from flat cars?**
6. **What is is desirable to set poles inside the property line on rural construction?**
7. **Explain how poles are lined up using three men with range rods.**
8. **Describe briefly the process for leveling the telescope of a combination level transit.**
9. **When it is impossible, due to an intervening hill, to see between the two points which fix the position of a pole lead, how is the transit used to stake out the line?**
10. **Describe how pikes and deadmen are used in raising a heavy pole.**

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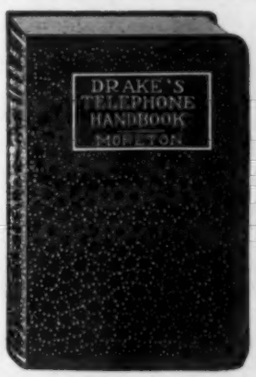

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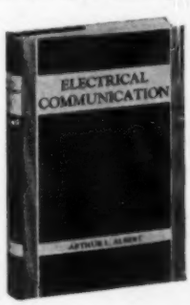

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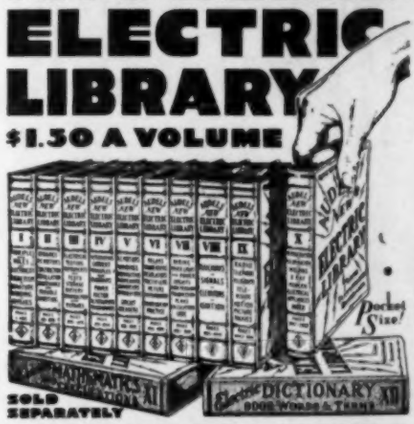

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Independents Featured In Bell Magazine

A total of over 10 pages of the May issue of the Bell Telephone Magazine is devoted to Independent Telephone Companies. The Bell Telephone Magazine was formerly the Bell Telephone Quarterly and is quite familiar to a large portion of our readers. The article was authored by H. M. Pope, general commercial problem engineer of the A. T. & T. Co.

Mr. Pope outlined the importance of the approximately 6400 connecting Independent companies and their vital necessity in providing a nation-wide telephone service. According to Mr. Pope the Independents own and operate approximately 4,400,000 telephones; have 10,000,000 miles of wire and handle in the neighborhood of 19,00,000 local and toll conversations daily. He also cites the high degree of co-operation enjoyed between the Bell System and the Independents. The article was illustrated by a map which was prepared by the United States Independent Telephone Association showing by a series of dots every Independent company operating in the U. S. and other charts giving detail of circuits etc. necessary in connections between the cooperating companies.

Zachary Rosenman Wins Vail Medal

Efforts of Zachary Rosenman, 8243 South Ellis Avenue, Chicago, to save the life of a baby will result in his receiving a Theodore N. Vail medal and a cash award of $100, it was announced June 2, by the Illinois Bell Telephone Company. Mr. Rosenman is a senior plant man in the Wentworth-Hyde Park office.

On August 16, 1940, Mr. Rosenman and his wife were apartment hunting and, upon hearing screams in the rear of 4721 South Drexel Boulevard, investigated and found a woman holding her three months old son. The child was apparently lifeless but Mr. Rosenman applied first aid methods and in about thirty minutes succeeded in reviving it. The infant was taken to a hospital, where it died thirty hours later, but the attending physician praised Mr. Rosenman's efforts and methods.

25 YEARS AGO THIS MONTH

Taken from TELEPHONE ENGINEER files of JUNE, 1916

Over 5,000 persons, thousands and thousands of miles apart in various parts of the country, heard one another talk, twenty-five years ago, May 16, when the American Institute of Electrical Engineers held a national meeting simultaneously in six cities of the United States, a feat never before accomplished in the history of the world. It was done by means of cross-continental telephone connections with a telephone receiver running to the ear of each listener, who heard the addresses made by some of America's leading scientists, as well as a musical program of national airs played in the six American cities.

▼

Mr. F. L. Gilman, assistant superintendent of the Western Electric Company was transferred during 1916 to the engineering department, with the title of assistant chief engineer.

▼

May 18, 1914, at the Franklin Institute, Philadelphia, the annual presentations of the Franklin Medal and Cresson Medal of the Institute were made. The Franklin Medal, which is awarded annually to those who have done most to advance a knowledge of physical science or its application, was presented to John J. Carty of the American Telephone & Telegraph Company and Professor Theodore W. Richards of Harvard University. The Cresson Medal, which is awarded for discovery of original research, was presented to the American Telephone & Telegraph Company.

▼

The Southern States Independent Telephone Association held a rousing convention at Knoxville, Tenn., May 23 and 24, 1916. The meeting was held at the Stratford hotel, and between 150 and 200 delegates from all parts of the South were present.

100,000th Telephone

NEW ORLEANS, May 15.—The 100,000th telephone was installed in New Orleans yesterday, sixty-five years after the first phone appeared. This city is the first in the deep South to reach that figure.

COMMUNICATIONS and ELECTRONIC Developments

Dielectric Losses on Toll Lines

THE Editor has often been asked, "why do the major long distance lines have pyrex type insulators and why are metal insulator pins used and the adjacent pins of a pair bonded together?"

The use of pyrex insulators and metal pins which are bonded to each other is done to minimize dielectric and shunt losses which take place at supports on open wire lines. These losses are important, mainly on long distance toll circuits and particularly where high frequency carrier systems are used. In ordinary exchange transmission we need to consider only the **series losses** but in the operation of carrier systems over long lines shunt losses are important and in some cases may be greater than series losses. These shunt losses are due to:

1—Direct leakage between the two wires of a pair via a thin film of water which may be present on glass and across arms during wet weather.

2—Dielectric loss in the imperfect dielectric materials on which the wires are supported, i. e., the cross-arm, pins, glass, etc.

3—Loss due to **charging current** which flows between wires via the relatively high resistance moisture path which exists during wet weather. This last loss is very important in the design of long distance toll circuits.

Another loss which has to be considered in toll circuits design where carrier systems are involved is the dielectric loss which occurs along the wires themselves when they are coated with ice. At the higher carrier frequencies this is a very important factor.

In the design of a toll circuit these several factors are kept to the minimum by the use of insulators which have exceptionally good dielectric properties which accounts for the use of pyrex which is an excellent dielectric.

By using metal pins and connecting the pair together a path is provided for the charging currents and less power is dissipated in the poor dielectric materials.

There is no way to minimize the loss due to dielectric effects when ice is present on the wires. As the several factors which affect transmission vary with temperature, frequency, and precipitation, it is necessary to use automatic regulators which adjust the gain of a long distance line, so as to maintain it at some uniform value regardless of periodic fluctuations in line losses.

Electric Shock Hazards

A recent article by Charles F. Dalziel and John B. Lagen of the University of California on the subject of muscular paralysis caused by electric current is of some interest to telephone men. This article which appeared in the March 1941 issue of the Electronics Magazine discusses the danger of electric shock from low voltage sources.

Extensive experiments were conducted at the University of California by the authors to determine the threshold point of muscular non-control (let-go current) of a group of men on both direct cur-

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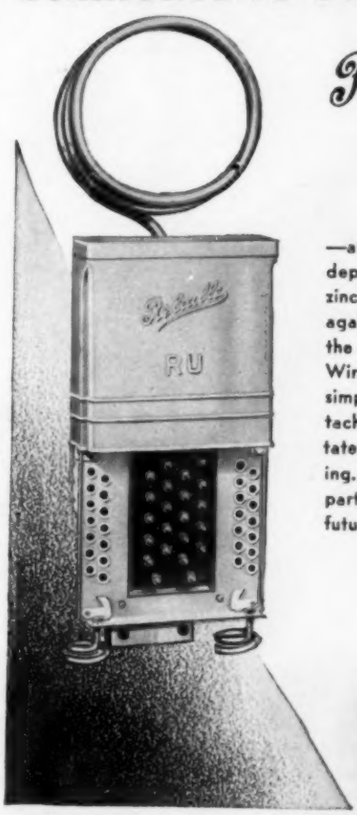

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rent and on alternating current at frequencies from 0 to 10,000 cycles. In these experiments a number of individuals placed one hand around a charged copper conductor and stood with one foot on a brass plate which completed the circuit. The series of tests were first conducted at 60 cycles to determine the threshold at which non-control of muscular activity occurred. In other words, the point at which the individual was no longer able to release the wire which he was holding. It was found that 75% of the men were not able to release the wire when the current exceeded 14.0 milliamperes, and that only a few were able to release the wire on a current of 20 milliamperes. This is shown by the graph of Figure 1, which is reproduced through the courtesy of **Electronics Magazine.**

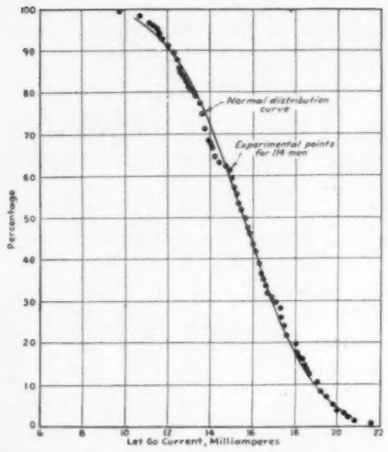

Fig. 1—Values of Let-Go Current for a Group of 114 Individuals (Courtesy Electronics Magazine).

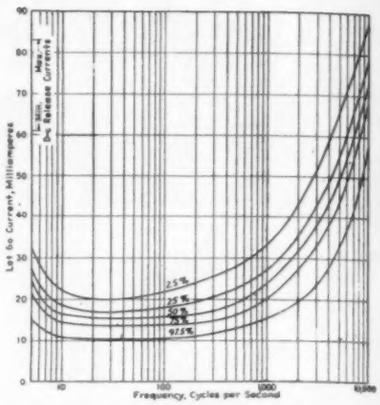

Fig. 2—Relationship Between Frequency and Let-Go Current. (Courtesy Electronics Magazine).

Similar tests were made to determine the relationship between frequency and the let-go current which the individual could stand. On these experiments it was found that the individual could stand a greater amount of direct current than alternating and that at the high frequencies individuals were able to stand higher currents without losing muscular control. Figure 2 shows the results of these tests.

Though it does not necessarily follow that the inability to let go of a charged wire would prove fatal, it could easily do so in some cases, particularly where an individual might have a bad heart condition. It does point out the necessity for caution when dealing even with low voltage circuits as voltages in the range of 110 volts to 220 volts can easily pass currents in excess of the let-go value through the body if proper contact is made.

Garland, Texas Cut Over

The Texas Telephone Company officials have recently announced the completion of a new dial exchange in Garland, Texas. The cut-over had been delayed for several days because of delay in receiving a small piece of equipment.

Mr. Sam Shutt, general manager of the telephone company, states that the change-over took about two hours time and that there was very little interruption in the phone service. Each patron of the company was notified of the change as their phone was being

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Telephone Operator Is Cited For Her Services

MISS Grace Keller, veteran telephone operator of the Bell Telephone Company and the Denver & Ephrata Tel. & Tel. Co., who retired in February after fifty-six years of service, was guest of honor at a testimonial dinner at the Hotel General Sutter, Lititz, Penna., Tuesday, May 27, 1941.

William F. Brossman, president of the Denver & Ephrata Tel. & Tel. Co., presented Miss Keller with a membership in the Independent Pioneer Telephone Association, of the United States.

In behalf of George W. Rodormer, president of the Pioneers, C. E. Eaby vice pres. presented her with an honorary life membership certificate and a badge denoting fifty-six years of service.

H. Milton Stewart of Harrisburg, executive secretary of the Independent Telephone Association of Pennsylvania presented her with a diamond-studded Pioneer service pin bearing the numerals, "56" and lauded her for her long service record.

Bertha M. Brossman, Assistant Secretary-Treasurer of the Denver & Ephrata Tel. & Tel. Co., recited a poem of her own composition entitled "Fifty-six Years An Operator".

Miss Kathryn Wendel, Chief Operator of the Bell Telephone Co., of Lancaster, and her Assistants presented her with a basket of fruit and the traffic operators of the same company gave her a pearl brooch.

Those attending were Fern Brossman, Mary Hornberger, Catharine Leibensperger, Kathryn McCloud, Miriam Weidler, C. E. Powell, employees of the Denver & Ephrata Tel. & Tel. Co., and Mrs. William Brossman, of Ephrata, Pa. Mrs. Milton Stewart, Harrisburg, Pa., Eva Fasnacht, Besse Bitner, Mary Lefever, Alta Thompson, Kathryn Baker, employees of the Bell Telephone Co., Lancaster, Pa.,

Telephone System To Change Hands

The Central Electric and Telephone Company, with branch offices in Charlottesville, Va., was granted conditional authority by the Public Service Commission to purchase the Jefferson County Telephone Company.

The Central Company proposed to buy property and securities of the West Virginia concern with the exception of $300 par value 6 per cent cumulative preferred stock. It was given until July 1 to consummate the transfer.

The Jefferson Company operates in Charles Town, Harpers Ferry, and Shepherdstown as well as toll and farm lines in Jefferson County.

Switchboard Using Braille In Blind Institution

A private branch exchange telephone switchboard for operation by the blind with its plungers embossed in Braille,—the first of its kind in Philadelphia—has just been installed by the Bell Telephone Co. of Pennsylvania at the Pennsylvania Institution for the Blind. Because on ordinary switchboards the operator is guided by signal lights, on this special PBX the plungers are embossed in Braille and, when a call comes in, the buzzer sounds a warning with the identifying plunger popping out at the same time. By touching the embossed plunger the blind operator is able to plug it in at the appropriate jack.

Illinois Company Orders Dial Equipment

Bloomington, Ill. — Automatic telephone service for Bloomington-Normal was a step nearer realization recently when the Illinois commerce commission authorized the Wabash Telephone company to purchase necessary equipment for automatic service from the American Electric Sales company of Chicago.

"Immediately upon issuance of the commission's order authorizing purchase," said R. B. Still, vice president and general manager, "the Wabash Telephone company passed its order to the American Automatic Electric Sales Company."

To be purchased is central office equipment, outside conduit, cables and accompanying materials for the Bloomington-Normal territory, he said.

A new building to house automatic phone equipment and offices will be constructed at North East and East market streets. A building on this site has been razed to make way for construction.

On Nov. 7, 1940, the commission granted the Wabash company authority to issue $450,000 in bonds to install the new equipment and "for a portion of a building to house" new toll switchboard equipment at the exchange.

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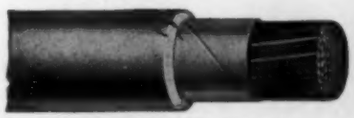
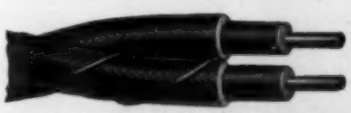


Telephone Switchboard Cable .... Silk and Cotton Insulated and Leaded



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Executive Honored By Dominican Republic

Recently honored by the Dominican Republic, Arthur F. Adams, president of Theodore Gary and Company, and chairman of the executive committee of Associated Telephone and Telegraph Company, was appointed an Officer of the Order of Merit "Juan Pablo Duarte" by President Manuel de J. Troncoso de la Concha.

Close and friendly relations have been maintained with the government of the Dominican Republic by Mr. Adams and his associates in the Gary company through Compania Dominicana de Telefonos C. por A., an operating unit of Associated Telephone and Telegraph Company.

I.T.&T. Acquires Federal Telegraph Co.

At a Special Meeting held June 6, the holders of Income Debentures of Commercial Mackay Corporation approved the sale by a subsidiary of its holdings of the Capital Stock of Federal Telegraph Company (amounting to approximately 99.76% of such stock) to International Telephone and Telegraph Corporation interests which will deliver in payment for the stock $300,000 in cash and $900,000 in Income Debentures, Series "A", of All America Corporation.

Federal Telegraph owns and operates a factory of 125,000 square feet at 200 Mount Pleasant Avenue, Newark, N. J., which designs and manfactures many types of radio equipment and kindred communication apparatus. It is employing at present 700 persons.

I. T. & T. has held, indirectly, a substantial interest in Federal Telegraph through its holdings in American Cable & Radio Corp. which, in turn, controls the Commercial Mackay Corp. Federal Telegraph will become a subsidiary of and will be closely allied with I. T. & T.'s new telephone and radio manufacturing company, International Telephone & Radio Manufacturing Corp, which is now equipping a factory at 231 Grant Ave., Newark, and will soon be producing equipment and supplies for I. T. & T.'s operating subsidiaries and other important communications companies in Latin America.

New Installations

Gail Wells, manager of the Northwest Telephone Company, Sheridan, Oregon, reports the installation of a Kellogg Relaymatic plant at Grande Ronde.

The West Coast Telephone Company converted their Scholls, Ore., exchange to dial equipment late in March. Equipment was furnished by Automatic Electric Company. Similar conversions with Automatic Electric's dial equipment are planned during April at Sherwood, Stafford, Beaverton and Tigard.

THANK YOU!

Dear Mr. Smith:

Company "A" (Construction Company) of the 60th Signal Battalion, U. S. A., from Fort Lewis Washington has just completed thirty-two miles of ten-pin and sixteen-pin open-wire line in Central California.

Your magazine, "TELEPHONE ENGINEER", has been helpful in instructing our new men, and has aided considerably in giving ideas and equipment data to our experienced men.

Congratulations on your "Wire Chief's Training Course". I have recommended that this Company receive three additional subscriptions per month. Could we arrange to get back-issues so as to prepare complete reference files of this course?

Kindly send me one each of your January-February and March 15th issues to be bound for reference with later numbers.

Yours truly,
Irwin C. Stoll
Captain, 60th Signal Battalion
Commanding Company "A"
King City, California

It Took a Fisherman

LIBERAL, Kan.—When the west end of the Edmond's bridge on highway 83 was torn away by the roaring flood waters recently, the toll line of the Southwest Telephone company was broken.

Linemen started to repair the line Sunday morning. Several attempts were made to throw a line across the open space of the bridge but all such efforts failed.

But the linemen were resourceful. Leon Ravenscroft suddenly remembered that Chas. Wood, a friend, was a fisherman.

An hour later, Wood stood on the west end of the bridge, and wound up for the cast of 140 feet. A few seconds later the weight bearing the line dropped within reach of the telephone workers on the bridge. A few moments later the telephone toll line was repaired and service resumed.

Exchange is Sold

The Waldron (Ind.) Telephone Company, owned and operated for the past 23 years by Ray Jones, has been purchased by Roy McDaniel of Waldron. The new owner is a business man of Waldron and has announced that plant improvements and extensions are planned. Dillard Lee will act as manager of the company.

New Switchboard Approved

The LaCrosses Telephone corporation has been authorized to install an addition to its LaCrosse switchboard at a cost estimated at $14,400 by the Wisconsin public service commission.

The local exchange now has 11,660 telephones in the city and constantly increasing business necessitates additional switchboard facilities employing three more operators.

Manager E. B. Samp states 480 telephones were added in 1939, 611 in 1940 and 200 during the first quarter this year.

Phone Company Changes Hands

The Iowa Standard Telephone Co., serving 18 communities in northeast Iowa, has been purchased from the Associated Public Utilities Corp., of Columbus, Ohio by the Central Iowa Telephone Co., who will operate it as a subsidiary.

The Central Iowa Company serves 40 towns in northern Iowa and southern Minnesota. Wallace Agee, Marengo, Ia., will manage the new properties which will serve 22,000 telephones.

Chas. F. McComsey

Friends of **Charles F. McComsey,** long time employee of the American Telephone & Teleg. Co., will regret to learn of his death, which occurred recently. He entered the service of the Bell system in December, 1903, and at the time of his death was employed as district line supervisor for the state of Florida. Mr. McComsey was born November 22, 1883, at Quarryville, Chester County, Pennsylvania.

10 Million Hear Roosevelt in South America

The President's historic speech on May 27 evening was heard by an estimated 10,000,000 radio listeners in South America in the largest network of radio stations ever arranged in the Americas. The South American hookup consisted of 10 stations in Argentina, 62 in Brazil, 14 in Chile, 3 in Uruguay and 2 in Bolivia. All America Cables and Radio broadcast the address to a street crowd through a loud speaker system at its main office in Bogota, Colombia. The radiotelephone channels were used to carry the President's voice and accompanying translations by way of the Bell System stations in New Jersey and the radiotelephone stations of International Telephone and Telegraph Corporation associated companies in Argentina, Brazil, Bolivia and Colombia and over the international cables to Chile and Uruguay. The South American broadcast was arranged by the I. T. & T. and the Columbia Broadcasting System.

Laboratory Developments To Aid Defense Plans

The importance of the research activities of the Bell Telephone Laboratories during 1941 will come to the forefront in the development of new materials to be used in cases where strategic elements for defense are directed into war production.

During 1940 among improvements which promise to be advantageous under the present defense material situation were the use of cellulose acetate in place of silk for the insulation of wires and cables in central offices; synthetic rubber covering for wire used in telephone installations giving better appearance and durability; drop-wire of longer life for connection between pole and subscriber premises. Improvement of methods of plowing cable underground also was devised, particularly in the case of simultaneous plowing in of twin cables, while for rural open wire lines use of longer spans of high-strength steel wire was devised to reduce the number of poles. A new handset coin-box telephone has been standardized and a new material, vicalloy, for magnetic tape recording was developed.

Buys Exchange

Omar Hilkerbaumer has purchased the Rosebud (Mo.) Telephone Exchange from B. F. Murphy of Owensville. Mr. Murphy has owned the Rosebud Exchange for eight years.

Phone Purchase Approved

W. D. Blacwell and W. L. Houldin have been authorized by the State Public Service Commission to purchase the Fyffe, (Ala.) Telephone Company from C. C. Goggans.

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Addresses Right of Way Association Meeting

John G. Mott, chairman of the board of Associated Telephone Co., Ltd., Santa Monica, Cal., was the principal speaker on Public Utilities Day program that met in Los Angeles June 4. His subject was History of Early California. Mr. Mott is particularly well versed in California history as he is a descendant of Don Jose Sepulveda, one of Spain and California's most illustrious families.

Announcement of the address was carried in the June issue of the American Right of Way Association News. In the same issue is an article by Ernest Irwin, general agent of Associated Telephone Co., Ltd. on "Telephone Service in Southern California."

Obituaries

William D. Mercer, 57, Alabama plant manager of the Southern Bell Telephone and Telegraph Co., died in Birmingham May 9 from a heart attack. Survivors include his widow and two daughters.

Hugh Kelly, 84, oldest member of the Charles S. Gleed Chapter No. 38 of the Telephone Pioneers of America, died recently at the Cresthaven Convalescent Home. Mr. Kelly, as an employee of the Missouri and Kansas Telephone Co., served as a local lineman and later as a general utility man for the succeeding company, retiring from active service in 1930.

Station Gain for May

There was a gain of about 121,600 telephones in service in the principal telephone subsidiaries of the American Telephone and Telegraph Company included in the Bell System during the month of May, 1941.

The gain for the previous month was 112,500 and for May, 1940, 86,000. The net gain for 5 months this year totals 605,400 as against 430,900 for the same period in 1940. At the end of May this year there were about 18,088,300 telephones in the Bell System.

The gain for May 1941 was the largest for the month of May in the history of the Bell System, the next largest May gain having been 95,738 in 1937.

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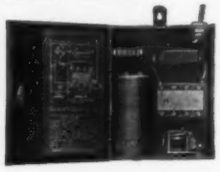

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New Dial Service for Port Byron

6000 calls the first day after the cut-over! When you consider that there are only 360 telephone subscribers in the whole town of Port Byron you begin to see the outstanding achievement that this was for the Port Byron Telephone Company when they replaced their old magneto board with a new 200 line Kellogg Relaymatic Switchboard.

When they were giving magneto service the Port Byron Telephone Company handled about 1500 calls a day. Since the installation of the new dial equipment they have averaged 2000 calls a day. In this way the company's subscribers put their stamp of approval on the new dial service.

Port Byron is a town of 1100 people located in central New York on the main line of the New York Central R. R., about 25 miles west of Syracuse. This town was one of the landing places on the original Erie Canal.

Because the company is now furnishing a higher grade of service, it has been able to raise rates. At the same time, since the Relaymatic does away with operators, the company does not have that expense and is therefore assured a much better profit at the end of the year than could be expected from their magneto equipment.

The Equipment, purchased from the Kellogg Switchboard & Supply Company of Chicago, is a 200 line Relaymatic equipped with first selectors. Some of the features of this board are: 1 to 10 party five-frequency ringing; secret service; busy tone to the calling subscriber if line called is in use; dial tone; revertive calls by directory number; conversation time interval automatically cut off after 6 to 8 minutes, preceeded by warning tone one minute before automatic disconnect, lines in trouble automatically locked out.

Telephone building at Port Byron, New York

First call over the new Kellogg Relaymatic at Port Byron, New York—Left to right—C. T. Weston, Manager, Mr. Weston's son Royce and G. A. Van Antwerp, President.

The Port Byron Telephone Company was founded in 1905 by C. W. Weston. Guy Van Antwerp is the President of the company. C. T. Weston, son of the founder is manager.

Brown University Offers Interesting Summer Course

Providence, R. I., June 8—A staff of 16 experts from Europe and America, representing "the best men available in the fields of mathematics, engineering and physics," has been selected to take charge of summer instruction and research in applied mechanics at Brown University, where special problems in defense industry will be studied by prospective defense technicians. Beginning on June 23 and continuing through Sept. 13, the summer session is designed to help overcome a bottleneck in the supply of men with highly specialized knowledge who are needed in defense industry.

The first program of its kind, the session at Brown will bring together on its teaching staff those "who are now so widely scattered that their work is relatively ineffective for instruction purposes," according to Dean Roland G. D. Richardson of Brown's Graduate School.

Reconstructed Equipment

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Western Elec. No. 20 Central Batt. Ind. Coil 35c—No. 46 @	.50
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Kellogg No. 2800 type 4-bar 1000 ohm ringer compacts latest type @	9.25
Stromberg Carlson No. 896 Latest type 5-bar 1600 ohm ringer compacts @	10.50
Kellogg No. 41 Receiver with New shell & cord @	1.25
Kellogg No. 101 E line drops and jacks 10 per strip @	16.00
Kellogg No. 1031-1042 Swbd. Keys on No. 1026 Ech. @	2.75
Kellogg No. 729 Central Battery Hotel sets (wood oak) with Booster coil and Straight line ringer @	6.75
Kellogg No. 103 3 Spring switch hooks @	.75
Connecticut Tel Combination Central Batt. & Magneto desk or hand set signal set with 3-bar Gen. 1000 ohm ringer and two Ind. Coils @	6.00
Western Elec. 4 Cell Metal Battery Boxes New @	.75
Kellogg, Monarch, Dean, Leich or Stromberg Carlson drops and jacks, per strip @	7.50
Kellogg, Dean, Monarch or Auto. Elec. 100 ohm drop coils @	.30

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